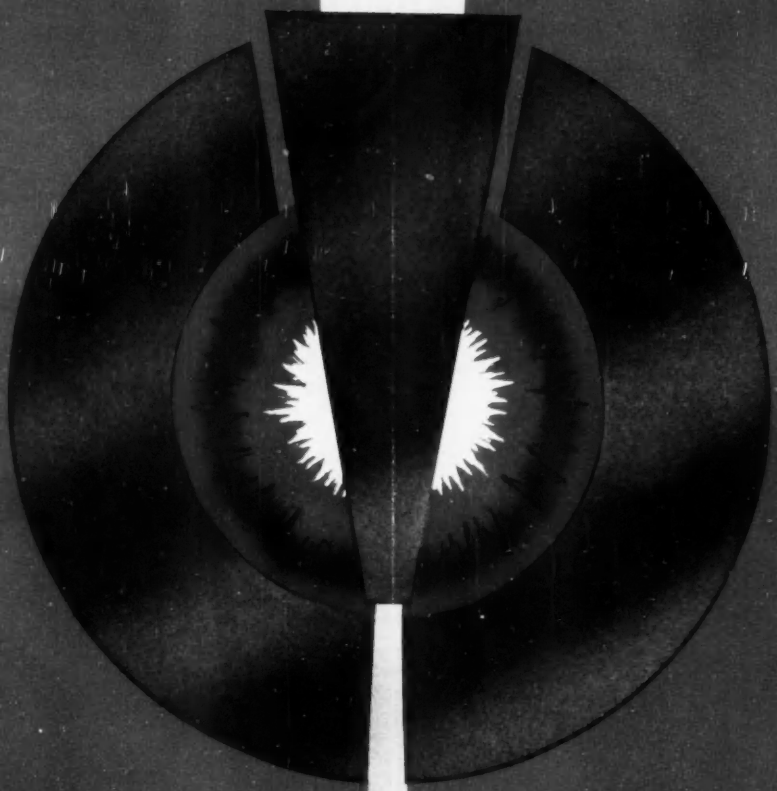
AUTOMOTIVE INDUSTRIES

JUNE 15, 1949



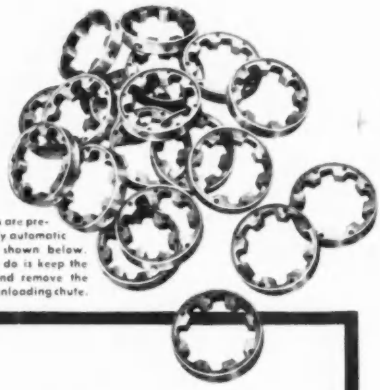
IN THIS ISSUE

Automation Applied to Axle Housings
Major Features of Studebaker's Automatic Transmission
The Downward Movement of Used Car Prices
New Records Set at Indianapolis Speed Classic

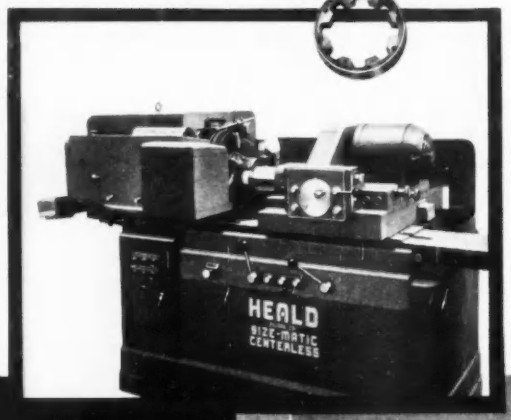
Complete Table of Contents, Page 3

A CHILTON PUBLICATION

PRODUCTION OF TRANSMISSION CAMS SHIFTS INTO HIGH!



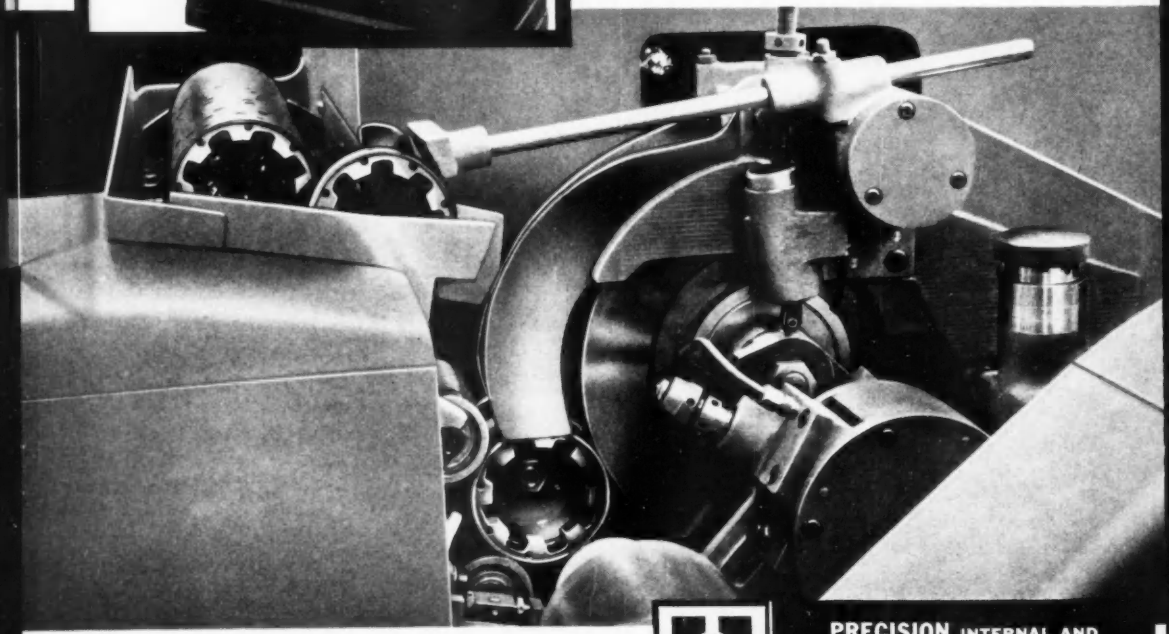
These transmission cams are precision ground on the fully automatic Model 281 Centerless shown below. All the operator has to do is keep the loading chute filled and remove the finished parts from the unloading chute.



Automotive manufacturer increases production 75% with New Heald Centerless Internals

Two Heald Model 281 Centerless Internals are now precision finishing transmission cams 75 percent faster than was possible by previous methods. The cams are of two different types — both ground on the I.D. on one machine. One type, however, has a counterbore on one side, which is ground on the I.D. and face simultaneously on the other Heald Centerless — by means of a backing plate which keeps the work in contact with the face of the wheel until the proper depth has been reached.

If you have work that can be rotated on its own O.D., why not see how much time and money you can save by doing it on a Heald Centerless Internal? Your nearest Heald representative will be glad to help you.



THE HEALD MACHINE COMPANY
Worcester 6, Mass.

Branch Offices in Chicago • Cleveland • Dayton • Detroit
Indianapolis • Lansing • New York

HEALD

PRECISION INTERNAL AND SURFACE GRINDERS

PRECISION BORE-MATIC FINISHING MACHINES

WAUKESHA ENGINES

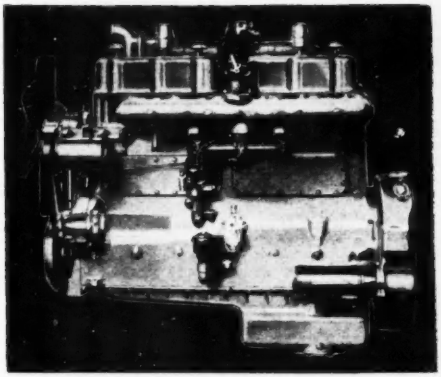
● Who's going to wait for the morning milk? Not the babies and small children—it's their breakfast. Not the big folks—it's the cream in their coffee.

And they don't wait—in Chicago. Grade A milk from the Waukesha County farms of the Hawthorn-Mellody Farms Dairy, Inc. of Chicago is rushed to the city by the corporation's Available Truck trains.

It's a 100-mile run—but there's nothing slow or pokey about this milk run. These trucks highball right along. Powered by Waukesha High Output Engines they maintain fast streamliner schedules, winter or summer.

Two Waukesha products—milk and engines —both Grade A.

The Waukesha 145-GKB High Output Engine is of the valve-in-head type—a rare combination of extra power plus extra speed, with rugged reliability. Specially designed for this kind of work, with . . . 7-bearing, 3½-inch crankshaft fully counterbalanced . . . precision bearings . . . downdraft carburetion . . . overhead valves with Stellite seats . . . removable hardened, wet sleeve cylinders . . . aluminum pistons. Arranged for full electrical equipment and all modern accessories. Get Bulletin 1402.

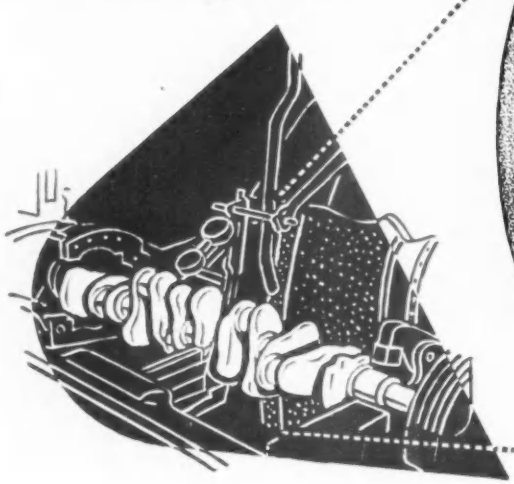


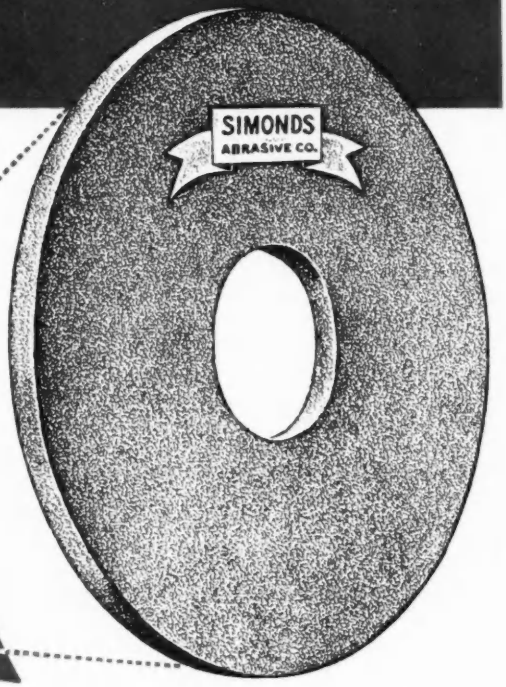
WAUKESHA Model 145-GKB HIGH OUTPUT ENGINE — Six cylinders, 5¼ in. bore x 6 in. stroke. 779 cu. in. displ. Develops 240 hp. at 2400 rpm.

WAUKESHA MOTOR COMPANY • WAUKESHA, WIS. • NEW YORK • TULSA • LOS ANGELES

SIMONDS
ABRASIVE CO.
PHILADELPHIA, PA.

Grinding Wheels

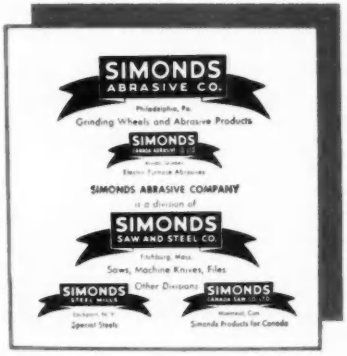




Try this on your crankpin grinders

For superior grinding . . . quality finish . . . high production, use Simonds Abrasive wheels with the recently developed V-12 bond. Especially efficient for crankshaft grinding, these wheels cut fast, cool and hold a good radius for accurate work. In wide use by car builders, crankshaft manufacturers and the regrinding trade.

Free Data Book describes the complete Simonds Abrasive line. Let's send you a copy, together with name of your nearby Simonds Abrasive distributor.



SIMONDS ABRASIVE COMPANY, PHILADELPHIA 37, PA. DISTRIBUTORS IN PRINCIPAL CITIES

AUTOMOTIVE INDUSTRIES

Published Semi-Monthly

June 15, 1949 Vol. 100, No. 12

Contents

One of the Publications Owned by

CHILTON COMPANY (INC.)

Executive Offices

Chestnut and 56th Streets, Philadelphia 39, Pa., U. S. A.

OFFICES

Philadelphia 39, Pa., Chestnut & 56th Sts., Phone GRanite 4-5600

New York 17, N. Y., 100 East 42nd St., Phone Murray Hill 5-8600; Chicago 1, Ill., Room 916, London Guarantee & Accident Building, Phone Franklin 2-4243; Detroit 2, Mich., 1015 Stephenson Bldg., Phone Madison 2090; Cleveland 14, Ohio, 1030 Guardian Bldg., Phone Cherry 4188; Washington 4, D. C., 1091 National Press Bldg., Phone Sterling 1844, 1845 and 1846; San Francisco 5, Calif., 605 Market St., Room 608, Phone Sutter 1-4951; Los Angeles 1, Calif., 6000 Miramonte Blvd., Phone Lafayette 5525.

Cable Address ..... Autoland, Philadelphia

Member: Audit Bureau of Circulations

AUTOMOTIVE INDUSTRIES is a consolidation of The Automobile (weekly) and the Motor Review (weekly), May, 1902; Dealer and Repairman (monthly), October, 1903; the Automobile Magazine (monthly), July, 1917, and the Horseless Age (weekly), founded in 1895, May, 1918.

AUTOMOTIVE INDUSTRIES, Vol. 100, No. 12. Published semi-monthly by Chilton Co., Chestnut & 56th Sts., Phila. 39. Entered as Second Class Matter October 1, 1925, at the Post Office at Philadelphia, Pa.; Under the Act of Congress of March 3, 1879. In case of Non-Delivery Return Postage Guaranteed. Subscription price: United States, Mexico, United States Possessions, and all Latin-American countries, $2.00 per year. Canadian and Foreign $3.00 per year; single copies, 25 cents, except Statistical Issue (Mar. 15th), $1.00.

Newest Victor Gasket Designs for High Compression Engines

VIC-2-BEAD

Dual-beaded thin metal. Proved in both L-head and Valve-in-head engines. Compressed thickness to .020

VIC-2-BEAD is the first thin metal gasket to effectively seal both types of engine heads at high compression ratios. It already has the acceptance of the automotive industry.

Sealing with VIC-2-BEAD does not depend on contact with the flat surface of the gasket. Seal is made by the precisely blended, embossed dual-beading around all combustion and coolant openings. When compressed, the beading creates a wave spring action which maintains maximum tightness from within. Sealing forces are concentrated where needed most, without danger of cylinder wall distortion. Once studs or cap screws are tightened to specified torque, retightening is unnecessary due to VIC-2-BEAD's sustained live sealing action.

VIC-2-FOLD

Thinnest practical metal-encased asbestos construction. Compressed thickness on engine .040

VIC-2-FOLD meets the requirements of modern high compression engines with the thinnest practical construction for a compressible metal-asbestos gasket. Combines the high breakdown resistance of steel, and the corrosion resistance of copper. Bottom steel layer is formed up in combustion openings to overlap the asbestos filler and copper top layer. The copper top layer is formed down into all waterways, and overlaps the bottom layer.

VIC-2-FOLD excels standard construction for flexibility, and has adequate compressibility for positive sealing in all applications. It has all desirable features of a general purpose gasket, equally suited for Valve-in-head and L-head engines, in gasoline or diesel service.

COMPLETE TECHNICAL DATA on these newest Victor designs supplied on request. Ask your Victor Representative or write today. Victor Mfg. & Gasket Company, P. O. Box 1333, Chicago 90, Illinois.

Manufacturers of **SEALING PRODUCTS** *Exclusively*

VICTOR

GASKETS · · OIL SEALS

VICTOR GASKETS AND OIL SEALS — SEALING PRODUCTS THROUGH RESEARCH

The Greatest Name in the Gasket Industry

CHECK
AND DOUBLE CHECK!

Piston rings on inspection tables fanned out for a 100% visual inspection—one of the many checks made to insure that Muskegon rings meet customers' blueprint specifications.

Additional checks using instruments and gages of special design are made for piston ring width, gap, tension, and light-tightness before the rings pass out of final inspection.

Facilities for all types of inspection are but one of the rich resources, in both plant and personnel, that stand behind Muskegon's *unique policy*.

Policy

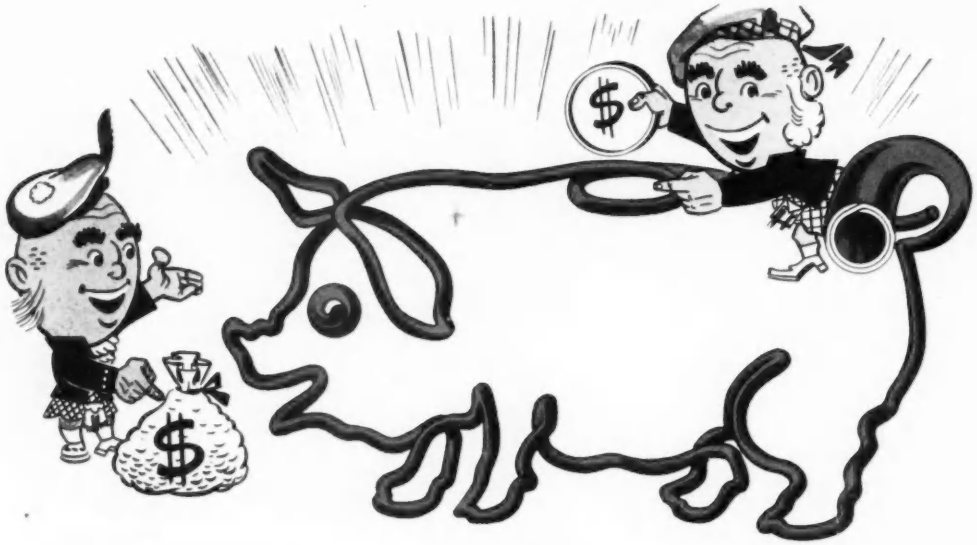
"It is Muskegon's firmly established policy to sell exclusively to manufacturers (1) for installation as original equipment and (2) for resale for service purposes."

MUSKEGON
Piston Rings

MUSKEGON PISTON RING CO.
MUSKEGON, MICHIGAN
PLANTS AT MUSKEGON AND SPARTA

"THE ENGINE BUILDERS' SOURCE"

ONE OF THE RESOURCES BEHIND A UNIQUE POLICY



Cash in on Bundyweld for better automotive tubing

You cash in on improved performance when you pick Bundyweld* Steel Tubing for your automotive needs. And here's why!

Bundyweld is made by a patented process . . . double-walled from a single strip, copper-brazed at all points of wall contact . . . for extra-strong tubing that's leakproof and resistant to vibration fatigue.

Lightweight and easily fabricated, Bundyweld Steel Tubing is amazingly ductile, and can be bent without fear of its collapsing or weakening structurally. With all its advantages, the cost of this unique tubing is surprisingly low.

Automotive manufacturers have found Bundyweld to be ideal in withstanding failure from vibration, shock and pressure in fuel lines, pressure lines and hydraulic brake line systems . . . *and that's why you'll find it in 95% of all cars made today!*

Why not check on this outstanding tubing, if you're not already using it? Contact your near-by Bundy distributor among those listed below, or write direct to: *Bundy Tubing Company, Detroit 14, Michigan.*

BUNDY TUBING

ENGINEERED TO YOUR EXPECTATIONS

*REG. U. S. PAT. OFF.

WHY BUNDYWELD IS BETTER TUBING

1 Bundyweld Tubing, made by a patented process, is entirely different from any other tubing. It starts as a single strip of basic metal, coated with a bonding metal.

2 This strip is continuously rolled twice laterally into tubular form. Walls of uniform thickness and concentricity are assured by close-tolerance, cold-rolled strip.

3 Next, a heating process fuses bonding metal to basic metal. Cooled, the double walls have become a strong ductile tube, free from scale, held to close dimensions.

4 Bundyweld comes in standard sizes, up to $\frac{5}{8}$" O.D., in steel (copper or tin coated), Monel or nickel. For tubing of other sizes or metals, call or write Bundy.

BUNDY TUBING DISTRIBUTORS AND REPRESENTATIVES

Cambridge 42, Mass.: Austin-Hastings Co., Inc., 226 Binney St. • ***Chattanooga 2, Tenn.***: Peirson-Deakins Co., 823-824 Chattanooga Bank Bldg. ***Chicago 32, Ill.***: Lapham-Hickey Co., 3333 W. 47th Place • ***Elizabeth, New Jersey***: A. B. Murray Co., Inc., Post Office Box 476 • ***Philadelphia 3, Penn.***: Rutan & Co., 404 Architects Bldg. • ***San Francisco 10, Calif.***: Pacific Metals Co., Ltd., 3100 19th St. • ***Seattle 4, Wash.***: Eagle Metals Co., 3628 E. Marginal Way • ***Toronto 5, Ontario, Canada***: Alloy Metal Sales, Ltd., 881 Bay St.

BUNDYWELD NICKEL AND MONEL TUBING IS SOLD BY DISTRIBUTORS OF NICKEL AND NICKEL ALLOYS IN PRINCIPAL CITIES.

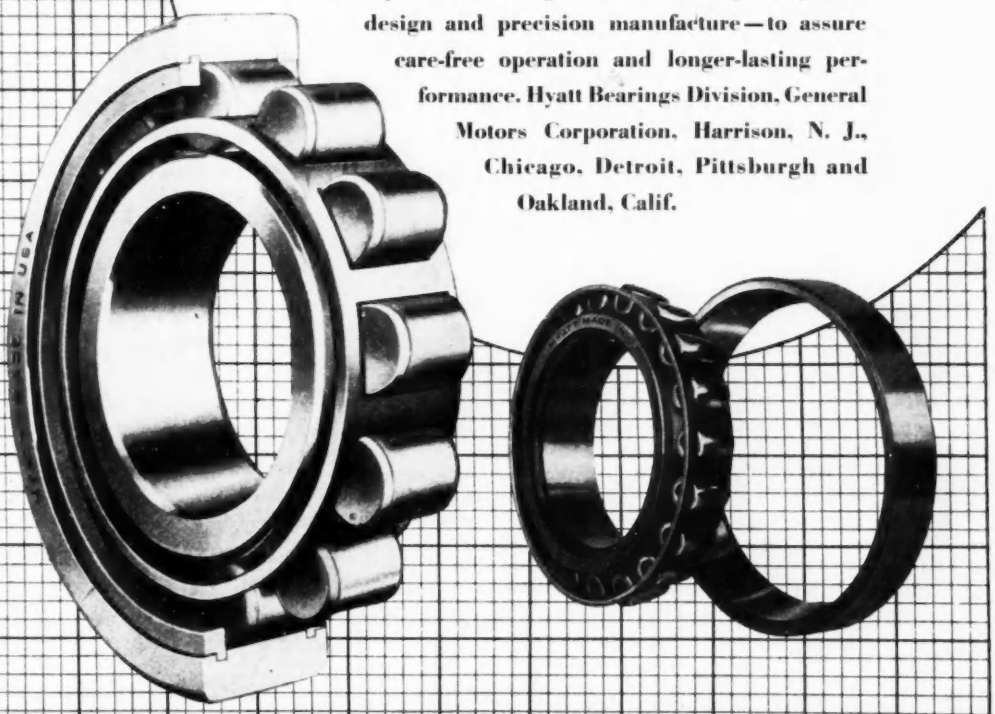
HYATT... Always as new as next month

Hyatt invented the roller bearing fifty-seven years ago.

Here at the birthplace, ever since, Hyatt has designed and produced roller bearings that are as new as next month.

As fast as design-engineers moved on to new products, a newer, better bearing was ready for them at Hyatt.

So during these many years, design-engineers and manufacturers of cars, trucks and buses have looked to Hyatt for the right roller bearings—right in design and precision manufacture—to assure care-free operation and longer-lasting performance. Hyatt Bearings Division, General Motors Corporation, Harrison, N. J., Chicago, Detroit, Pittsburgh and Oakland, Calif.

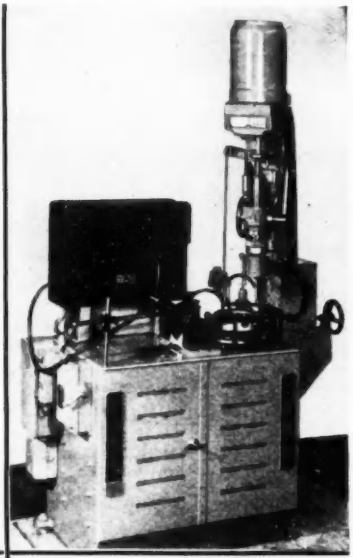


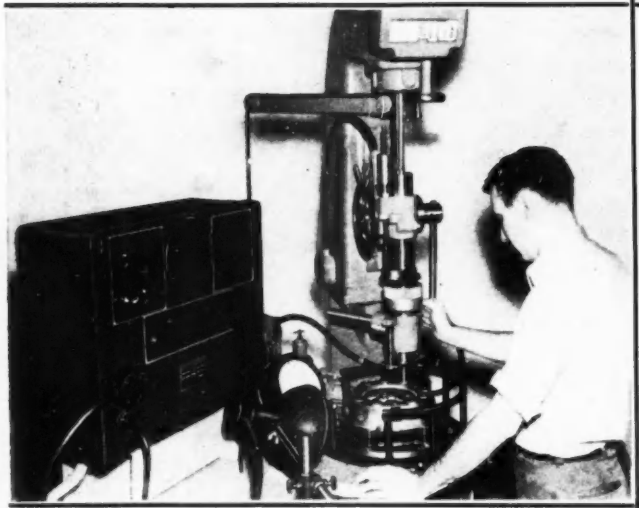
HYATT ROLLER BEARINGS

MACHINE BALANCES CLUTCH ASSEMBLIES!

Phenomenal speed and accuracy are achieved with the Gisholt machine which performs all four steps in the complete balancing operation as follows: (1) locates unbalance, (2) measures unbalance, (3) corrects unbalance, (4) checks balance. Designed especially for this work, the machine handles operations at the rate of 80 pieces per hour.

Gisholt ISV Dynetric Balancer





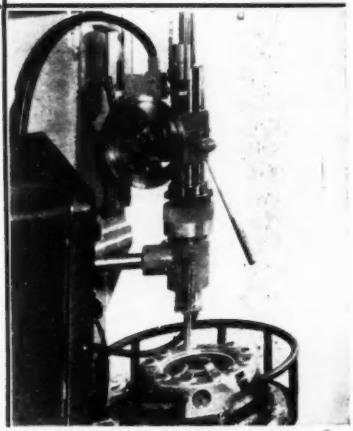
Saves handling time

With correction drill incorporated as a part of the machine, it is unnecessary to remove work piece from mounting for drilling. Handling time is cut to a minimum.

Corrections clearly indicated

Readings clearly show where and how much metal is to be removed in units of drill depth. All chips are automatically ejected so they cannot get caught in the clutch pressure springs.

Insures better service Whether it's in production or repair work, the balancing of clutch plate assemblies is of little avail unless it is done *accurately*. And here, again, the DYNETRIC principle provides the accuracy which makes Gisholt the unquestioned leader in the field of balancing. Full information on request.



GISHOLT MACHINE COMPANY
Beautiful Madison, Wisconsin

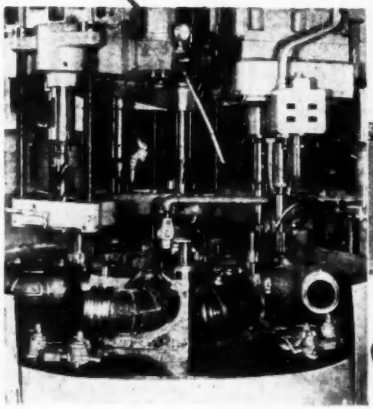
DYNETRIC BALANCERS — GISHOLT

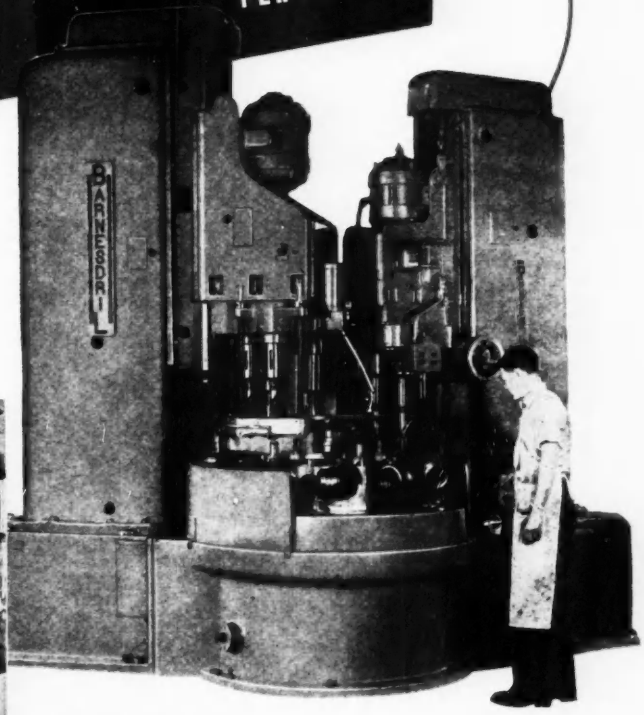
DEVELOPED JOINTLY WITH WESTINGHOUSE ELECTRIC CORPORATION
"DYNETRIC" IS A TRADE MARK REG. U. S. PAT. OFFICE BY WESTINGHOUSE ELECTRIC CORPORATION

TURRET LATHES • AUTOMATIC LATHES
BALANCERS • SUPERFINISHERS • SPECIAL MACHINES

Cuts PRODUCTION TIME FROM 12 TO 2 MINUTES PER PIECE

DRILLING
COUNTERBORING
TAPPING
} TWO 1¾" HOLES IN SOLID FORGINGS





"TAILORED-SKIL by BARNESDRIL"

There is no need for individual piece handling, fixture changing, or idle machine time when BARNESDRIL Unit-Type Machines take over machining operations. Continuous operation, automatic-cycle timing and combined operations eliminate these non-productive factors. Smooth, steady flow of finished pieces is predetermined by engineered cycle-control and timing.

This machine, for example, operating on a 55-second cycle, drills, counterbores, and taps two 1¾"-12 holes from solid forgings in one minute 50 seconds floor-to-floor. Best previous time has been 12 minutes. On a similar part, smaller in size, production is 2 holes (1 complete part) per minute, as against former time of 9 minutes.

These results show the tremendous savings to be gained through application of Unit-Production machining in your shop. Ask a BARNESDRIL engineer to demonstrate these savings on your type of work. Also, send for new circular outlining capacities and specifications. Ask for Bulletin B1509.

BARNES DRILL CO.

850 CHESTNUT STREET ROCKFORD, ILLINOIS U.S.A.

Serving World's Industries in Countless Ways

WESTERN Felt

JUST A FEW USES:

- Retaining lubricants
- Isolating vibration
- Controlling temperature
- Reducing weight
- Excluding dust, grit, etc.
- Cushioning shock
- Filtering liquids
- Grinding and polishing gaskets, grommets, etc.
- Padding, packing, sealing

Felt's versatility suggests unlimited applications for design needs. Western Felt is available in any form—rolls, sheets, custom cut parts. Felt can be treated chemically to meet practically any requirement.

Western Felt, processed from wool-soft to rock-hard does not fray, ravel or lose its shape. It is cut to remarkably close tolerances and its uniformity is unsurpassed. Felt can be supplied to meet Army, Navy and S.A.E. specifications.

Why not check Western Felt's superior qualities and possible uses. Our engineers will gladly cooperate.

102

Acadia Synthetic Products Division, Processors of Synthetic rubber and Plastics, sheets, extrusions and molded parts.

WESTERN FELT WORKS

4035-4117 OGDEN AVENUE, CHICAGO 23, ILLINOIS

Branches in All Principal Cities

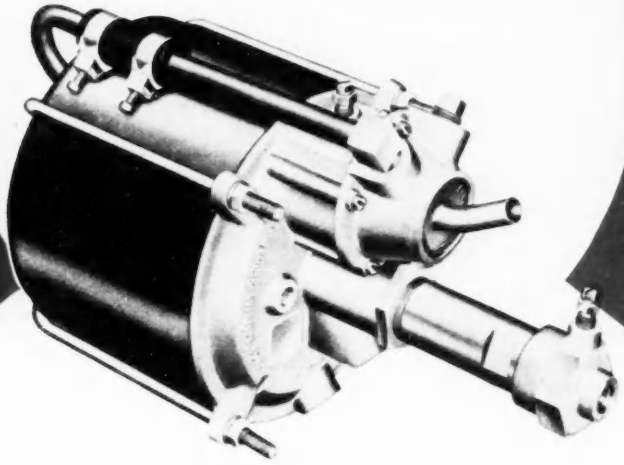
LARGEST INDEPENDENT MANUFACTURERS AND CUTTERS OF WOOL, HAIR AND JUTE FELTS

Bendix Products

BUILDERS OF THE BASICS OF

BETTER MOTOR VEHICLES

2 MILLION INSTALLATIONS...



HYDROVAC...

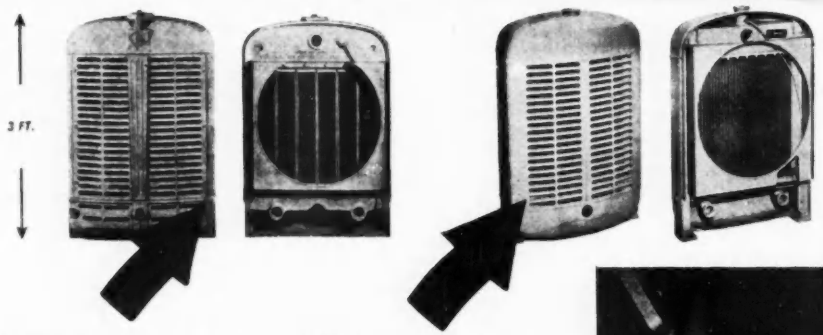
the Undisputed Leader in Power Braking!

By the clear logic of numbers, two million Bendix Hydrovac* installations lead to certain obvious conclusions: first, that a definite need for power braking is now widely recognized by truck users and manufacturers, and second, that Hydrovac is the power brake most of them prefer. There is much to support the conclusion, therefore, that Hydrovac power braking might very profitably be included in the original equipment specifications of most truck manufacturers.

BENDIX PRODUCTS DIVISION of Bendix AVIATION CORPORATION
SOUTH BEND 20, INDIANA

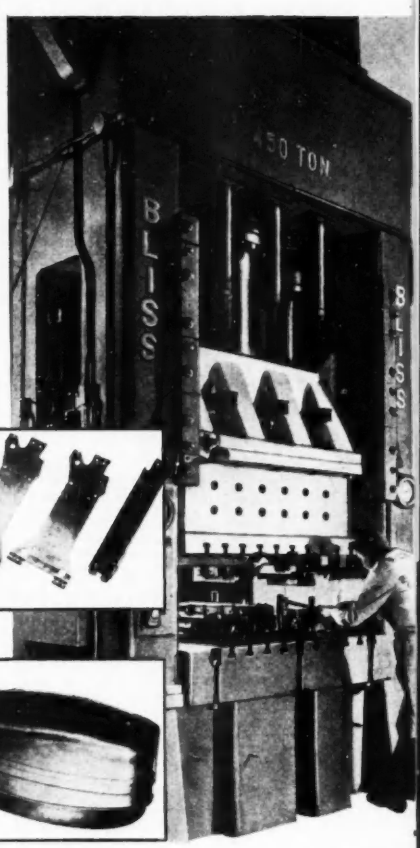
Export Sales: Bendix International Division, 72 Fifth Avenue, New York 11, N. Y.

*REG. U. S. PAT. OFF.



Casting-to-Stamping saves as much as 30% for Young Radiator Co.

450-Ton Bliss Hydraulic Press solves delivery, weight and durability problems



To achieve lighter, stronger and more cleanly designed radiators for automotive and industrial applications, the Young Radiator Company, of Racine, Wis., manufacturers of quality heat transfer equipment, recently converted the outside casings, tanks and side members from castings to formed steel parts. As it has consistently for 20 years, it chose Bliss to specify the press for the job. The resulting savings have been as much as 30%.

Today this 450-ton single-action hydraulic press is the pride of the plant. The weight of the radiators has been more than halved, and the drawn tanks provide as much cooling and are more durable than their cast counterparts. Besides the drawing of tank shells and housings, the press is used for forming operations on steel, aluminum and other metals.

Bliss, as it has for 90 years, did more than build a press. It provided the vital engineering knowledge for its maximum production. That's why 70% of Young's press equipment is Bliss-built...why President F. M. Young, who says, "We have long been advocates of Bliss presses and service," attributes much of the credit for his company's press production to Bliss engineering counsel.

This service and engineering counsel are at your disposal. You'll find, as Young Radiator Company has for more than two decades, that "Bliss" on your press is more than a name—it's a guarantee!

E. W. BLISS COMPANY, TOLEDO 7, OHIO

Mechanical and Hydraulic Presses, Rolling Mills, Container Machinery

WORKS AT: Toledo, Salem, Ohio; Hastings, Mich.; Derby, England; St. Ouen sur Seine, France • SALES OFFICES AT: Detroit, Mich.; New York, Rochester, N. Y.; Cleveland, Toledo, Salem, Ohio; Philadelphia, Pittsburgh, Pa.; Chicago, Ill.; New Haven, Conn.; Windsor, Ont.

See Our Catalog in SWEETS

Feature of this Bliss Hydraulic Press which delights Young is its extreme flexibility: use of the outside cylinders for jobs up to 175 tons pressure; availability of full 450-ton pressure for heavier work, ability to accommodate off-center loads; quick advance and quick return; inching for die-setting and safety afforded by central push-button operation.

Above photo shows second and third forming operations of 18-gauge steel on radiator side members (inset, top). A third die will handle the initial piercing operation. A Bliss hydraulic cushion ejects the stamping...this cushion was previously used as a blankholder to draw the shell, 7⅝" deep x 18" x 27" (inset, bottom), which is subsequently split in the center to form the top and bottom parts of the radiator housings shown at heading of page.

BLISS BUILDS MORE TYPES AND SIZES OF PRESSES THAN ANY OTHER COMPANY

STAY AHEAD WITH *Bliss*

Another outstanding J&L development—

"E"

J&L STEEL

J&L E FREE-CUTTING STEEL

A New Bessemer Screw Stock with Proved Machinability Ratings as High as 170!

- **Backed by 50 years of leadership in the field of free-machining, cold-finished steels.**
- **Proved by exhaustive field testing.**

Forty-five independent machine shops, throughout the metal-working industry, have tested over *6,100 tons* of J&L "E" Steel in more than 100 applications. These shops report:

- **Better Machine Finish**
- **Longer Tool Life**
- **Higher Speeds**
- **Machinability Ratings up to 170**
- **Better Response to Forming and Cold Work**
- **Higher Magnetic Permeability**

For 50 years J&L has led in the development of free-cutting, cold-finished steels—both bessemer and open-hearth. Every new J&L steel introduced in this field has been a major contribution toward the lowering of the unit cost of machined steel parts. *Now we offer you J&L "E", a bessemer grade steel with distinctly greater free-cutting efficiency*

You will want complete information on this latest J&L steel development. Let us discuss the money-saving possibilities of J&L "E" Steel with you. The coupon is for your convenience.

J&L "E" Free-Cutting Steel is made in *three* grades: E-15, E-23 and E-33, each within the composition limits of the standard bessemer screw steels and with similar tensile properties. Note the following equivalents:

E-15—equivalent standard grade, B-1111
E-23—equivalent standard grade, B-1112
E-33—equivalent standard grade, B-1113

Jones & Laughlin Steel Corporation
430 Jones & Laughlin Building
Pittsburgh 19, Pa.

I should like to have more information on J&L "E" Free-Cutting Bessemer Screw Stock. Please have your representative call.

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

JONES & LAUGHLIN STEEL CORPORATION

From its own raw materials, J&L manufactures a full line of carbon steel products, as well as certain products in OTISCOLOY *and* JALLOY *(hi-tensile steels).*

PRINCIPAL PRODUCTS: HOT ROLLED AND COLD FINISHED BARS AND SHAPES • STRUCTURAL SHAPES • HOT AND COLD ROLLED STRIP AND SHEETS • TUBULAR, WIRE AND TIN MILL PRODUCTS • "PRECISIONBILT" WIRE ROPE • COAL CHEMICALS

AUTOMOTIVE INDUSTRIES

The Authoritative Technical and News Magazine That Gives Comprehensive Coverage, Domestic and Foreign, of These Industries:

Passenger Car	Engine	Parts and Components
Truck	Body	Accessory
Bus	Trailer	Production Equipment
Aircraft	Road Machinery	Service Equipment
Tractor	Farm Machinery	Maintenance Equipment

High Spots of This Issue

Japan's Automobile Industry Regains Pre-War Potential

Three years after the surrender, the Japanese government, aided by the occupying powers, has restored the Japanese automobile industry to its highest pre-war potential. This special report from Tokyo, touching also on history, affords an excellent analysis of the Japanese situation, both domestic and export-wise, beginning on page 25.

New Records at Indianapolis

A tabulation of how all racers finished in the fast and fascinating 33rd Indianapolis 500-mile race is given in this article authored by John Bond. Discussion also centers around the supercharged vs. the unsupercharged car, the trend away from building new cars designed only for the Indianapolis track, and the general car-owner agitation for an increase in the prize money. Turn to page 26.

Solving Cadillac Engine Problems

Many specific projects were introduced during development of the 1949 Cadillac to improve quality and durability of engine components. One was optimum piston pin offset of 1/16 in. toward the major thrust side to combat piston slap. Another, re-design of connecting rod forgings to reduce fatigue test failures. Still another, use of stroboscopic light to check the important path of the oil stream on cylinder walls. This article, replete with diagrams, drawings and a table of Cadillac comparative engine weights, starts on page 30.

Automation in the Production of Axle Housings

Ford automation principles at the very unusual Mound Road plant permit production of 2000 completely machined rear axle banjo type housings per eight hour day. This interesting article, liberally illustrated, describes operation of a new machine comprising a group of presses arranged about a circular indexing fixture—culmination of culminations in the company's automation-pioneered tools for mass production. See page 34.

Automatic Transmissions—Part III—Chrysler

Sequel to Part I in April 15th issue, and Part II in May 1st issue of AUTOMOTIVE INDUSTRIES, Part III describes and illustrates the latest hydraulically-operated automatic transmission offered by Chrysler Corp. on its Chrysler, DeSoto and Dodge cars. Page 38.

29 New Product Items And Other High Spots, Such As:

Major features of Studebaker's Borg-Warner automatic transmission; lack of a Spring rally in used car prices; the position of chief engineers in the affairs of management; Fiat Diesel-powered heavy duty trucks; and new machines offered for automotive production.

News of the Automotive Industries, Page 17
For Complete Table of Contents, See Page 3

buying alloys?

only at Ryerson

do you get these three:

1 *Stocks of selected quality*

2 *Test-proven performance*

3 *A guide to heat treatment*

...yet Ryerson gives you this three-way guarantee of satisfaction at no additional cost. So contact the Ryerson plant nearest you for any alloy steel requirement.

OTHER RYERSON PRODUCTS

Bars—Stainless, hot rolled and cold finished carbon steel, reinforcing

Structurals—I Beams, H Beams, channels, angles, etc.

Plates—Sheared and U. M., Inland 4-Way Floor Plate

Sheets—Hot and cold rolled, many types and coatings

Tubing—Seamless and welded mechanical and boiler tubes

Stainless—Allegheny metal bars, sheets, plates, tubes, etc.

Machinery & Tools—For metal fabrication

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS: NEW YORK, BOSTON, PHILADELPHIA, DETROIT, CINCINNATI, CLEVELAND, PITTSBURGH, BUFFALO, CHICAGO, MILWAUKEE, ST. LOUIS, LOS ANGELES, SAN FRANCISCO.

NEWS *of the* AUTOMOTIVE INDUSTRIES

Vol. 100, No. 12 **June 15, 1949**

RACY SOPHISTICATION

Designed and built by Lou Fageol, president, Twin-Coach Co., the Fageol Super-Sonic Sport car is powered by a 275-hp. all-aluminum, Fageol marine engine. The car weighs 3250 lb. and is said to be capable of speeds over 150 mph. It is planned to run the car on the Bonneville Salt Flats, or at Daytona Beach soon, and plans for producing duplicate cars, with certain modifications are being considered.

Second Quarter Output to Set Postwar Record

With the settlement of the 26-day Ford strike, the industry is expected to set a new postwar production record this month. It is estimated that if present schedules are met, the industry will turn out about 550,000 units and bring second quarter production to a new postwar high. Had it not been for the Ford strike the industry probably would have set a new all-time second quarter production record and would have passed the three million mark by the end of June. However, U. S. motor vehicle sales in April were the highest for any month since June, 1929. For the first five months of this year, passenger car production is estimated at about 1,872,600 units with trucks accounting for an additional 518,900 units for a total of nearly 2.4 million. Passenger car production was more than 400,000 units ahead of the same period a year ago, but trucks had fallen off more than 72,000. With Ford back into production, even though it was the middle of this month, all plants were back in operation, it now seems certain that June will be a banner month. It is interesting to note that during May when GM hit an all-time production peak, the corporation total amounted to more than 55 per cent of the industry's output.

Studebaker-B-W Deal to Spur Automatic Transmissions

Now that Studebaker is committed to use of the new Borg-Warner automatic drive, developments among other independents are expected to come along rapidly. The Studebaker transmission will not be available until very late this year, and undoubtedly will be offered first on the higher priced Commander series at extra cost. Nash will also have an automatic drive for its Ambassador series late this year, but whether it will be Hydra-Matic, a Borg-Warner unit, or its own design has not yet been decided. With Studebaker breaking the ice, there is a possibility that a Borg-Warner unit may be used by several independents, thus lowering cost for all of them through volume production of a standard model. It is reported to be a type using sheet steel components in place of castings.

Buick to Announce New Model Soon

The new Buick Series 40 model will be announced to the public early in August. The 40 will have the newly styled "B" body which has been out of production all this year, and will have completely new lines. It is reported also that the Special will lack much of the costly trim features currently used on the more expensive Buick Super and Roadmaster series. The Dynaflow torque converter transmission will be optional at extra cost.

Others Not Expected to Follow GM Cuts

The general belief in Detroit now is that price reductions by other manufacturers will probably not immediately follow the latest GM price cut as they did earlier this year. The possible exceptions are the Chrysler Corp. and Studebaker, which did not reduce prices in the general reduction during March and April. The latest GM cuts are: Chevrolet, $10 on all car and truck models; Pontiac, $15 across the board; Oldsmobile, $15 on series 76 models and $20 on series 88 and 98 models; Buick, from $16 to $30; Cadillac $25 on series 61 and 62 models, $30 on series 60, $40 on the series 45; GMC Truck & Coach, $10 on all models from ½-ton through 2½-ton, but no change on larger models.

Changes in Top Management of Mack Trucks

Mack Trucks, Inc., has announced that L. G. Bissell, chairman, and C. T. Ruhf, president, have relinquished their positions and that E. D. Bransome, president and director of the Vanadium Corp. of America, has been elected to both posts. Both Mr. Bissell and Mr. Ruhf will continue as board members of Mack Trucks, and the latter will continue with Mack in a consulting capacity.

Kaiser-Frazer Appoints Top Staff Officers

The Kaiser-Frazer Corp. has announced two appointments affecting its

SUBURBAN PLYMOUTH

The Plymouth Suburban, a new combination passenger and utility vehicle of all-metal construction, has just been announced. Built on a 111-in. wheelbase, and powered by a 97-hp engine, the car's retail price at factory, Detroit, Mich., is $1740.

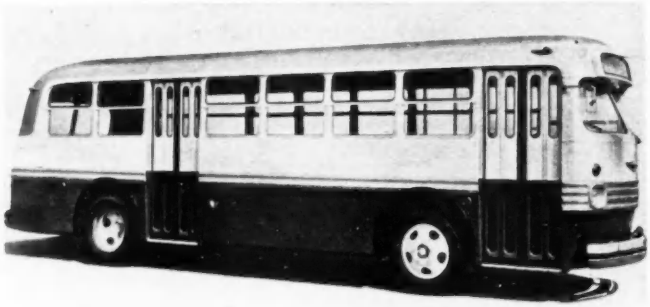
top level staff. John L. Hallett, formerly works manager, has been made general manager. He joined the K-F staff in the fall of 1946 after being associated with Kaiser industries since 1938. He will be succeeded by John H. Tacke, factory manager for the last two years. The company has also announced the appointment of Michael Miller as vice president and executive assistant to Edgar F. Kaiser, president of K-F. He had previously served as vice president in charge of administrative engineering. Before joining K-F in 1946, he had served in executive capacities with Kaiser enterprises since 1931. He is president and director of Kaiser-Frazer of Canada, Ltd.; vice president and director of Kaiser-Frazer Export Corp.; a director of Kaiser-Frazer Sales Corp.; and director of Kaiser and Frazer Parts Corp.

Arthur Wieland Joins Ford International

Arthur J. Wieland, who recently resigned as an executive vice president of Willys-Overland Motors, has been appointed vice president and general manager of Ford International, Inc. Before joining Willys, he had been associated with General Motors Export Corp., becoming assistant to the president in 1925. He joined Willys as director of sales in 1946.

Pontiac Revises Plan for Car Allocations

GM's Pontiac Motor Div. has revised its allocation system for distribution of new cars to dealers. Since the first of May, cars have been allocated to the various zones in exactly the same proportion as previously, but the zone manager now has discretion in allocating the cars to dealers in the zone. As a result, some smaller dealers who previously had been hampered by low quotas stand to benefit if, in the opinion of the zone manager, they should receive a larger share than they did under the old GM distribution plan.



FORD METROPOLITAN

Metropolitan Motor Coaches, Inc., a subsidiary of the Ford Motor Co., has announced this new 31-35 passenger coach. With a 182-in. wheelbase, the new coach is powered by a six-cyl. 254-cu in. Ford coach engine. Available as a replacement engine, over 2000 are now in use.

Union Accepts Arbitration to End 26-Day Ford Strike

It is still too early to evaluate who lost most in the Ford strike, since the answer will not be known until the arbitrator's decision is handed down, which may be from four to six weeks. An interesting fact about the strike is that the union ultimately accepted arbitration which it had originally steadfastly refused to do, thus precipitating the strike. As a face-saving gesture, the union officials announced that the wording of the arbitration clause was entirely different from that originally proposed by the company, but a careful check reveals no significant change in principle. Immediately following the agreement to return to work pending a settlement of the speed-up dispute by arbitration, Ford and union negotiators got down to work on contract talks. It is felt in Detroit that the union's position was greatly weakened by the strike, since it might be rather difficult to pull the workers out again after 26 payless days off the job.

Former Director of K-F Reveals Merger Try

Approximately two years ago Kaiser-Frazer attempted to form a corporation which would include Mack Truck, Willys-Overland, Reo, Graham-Paige, and Kaiser-Frazer, but the plans never materialized, according to O. H. Motter, vice president and general manager of Frazer Farm Implement Co. and a former K-F director. He made the statement at a Graham-Paige stockholders' meeting in Lansing, Mich., early in June. He said that directors of the Frazer Farm Implement Co. visited Reo while in Lansing for the meeting, but said that there was no deal pending at present for K-F or Graham-Paige to buy the Reo plant, as had been reported. Stockholders at the meeting of the farm implement firm, which is a Graham-Paige subsidiary, authorized an increase in capitalization of two million shares of common stock.

GM Starts to Build New Research Center

With construction scheduled to start about the middle of this month, the new

GM Technical Center is slated to be a purely research and technical fact finding and experimental development activity. C. E. Wilson, GM president, however, has stated that inasmuch as the new center will have no direct product responsibility for the output of manufacturing units, there will be no change in the GM concept of divisional responsibility for each division's product engineering. Plans for the Technical Center were first announced in July, 1945, but were deferred because of materials shortages. Extending over the next three years, construction will get underway with ground breaking for the Engineering Group, which will consist of administration and drafting, shop and dynamometer buildings, a total of 235,000 sq ft of office and shop space. The center is being built on a 350-acre site at Mound and Twelve-Mile roads north of Detroit.

$41 Million Awarded in GM Bonus Plan

Details of the GM bonus plan for 1948 have been confused by press reports which apparently did not understand that details from the SEC failed to cover the complete list of persons receiving awards. The facts are these: Total number of bonus awards for last year is 3799, including awards made to employes receiving less than $650 a month which is the usual eligible salary rate. The awards aggregate $40,979,700 and will consist of $32,571,079 in cash and 141,798 shares of GM common stock. For bonus purposes the stock is valued at $59.30 a share. Each award of more than $1000 under the bonus plan shall be paid in annual installments of 20 per cent or $1000 whichever is greater. The first two installments of any 1948 bonus awards are to be paid 50 per cent in common stock and 50 per cent in cash and the remaining installments if earned out by the beneficiary in accordance with the terms of the plan for the following three years shall be entirely in cash. The Chrysler Corp. is reported to have paid out slightly in excess of $4.5 million in "contingent compensation" to 4991 employes last year, and has set aside an additional $6.4 million out of 1948 earnings for similar payments under the bonus system this year. Both Chrysler and GM asked SEC to keep confidential certain details and names involved in the bonus plans. No bonuses were reported by Hudson, Packard, Kaiser-Frazer and Studebaker, although the salaries of officials were given. Since Ford Motor Co. stock is not listed on any exchange, the company makes no report to SEC. Willys-Overland reported that it adopted an incentive compensation plan at the beginning of 1948 and that $337,000 was in the fund by the end of last year, but distribution had not been made when the report was filed.

Continental Assembles First Air-Cooled Tank Engine

Final assembly of Continental Motors Corp.'s first air-cooled tank engine under the company's $18 million Ordnance Dept. contract was completed recently. To be standard equipment for the newest and most powerful tanks, the new engine is a 12-cyl, 810-hp unit.

Walker Again Signs with Ford Motor Co.

A new retainer has been signed with the Ford Motor Co. by George W. Walker, prominent industrial designer. Mr. Walker, the consulting stylist in the design of the 1949 Ford, served Ford as styling consultant for two years, starting in July, 1946. To act as consultant on the styling of all Ford products, including Ford, Mercury and Lincoln cars, and commercial units, Mr. Walker will work in collaboration with John Oswald, Ford executive engineer in charge of styling and body engineering, and George Snyder, chief stylist.

Canaday Elected Chairman of Willys Board

Ward M. Canaday has been elected by the Willys board of directors to succeed James D. Mooney who resigned as chairman of the board of directors. Mr. Mooney had previously resigned as president, but that position has not yet been filled. Delmar C. Roos, vice president in charge of engineering, is now first vice president succeeding Arthur J. Wieland, who also resigned. Marcell F. DeMuller was elected president of Willys Overland Export Corp., and of Willys Overland of Canada, Ltd., to succeed Mr. Mooney in the dual position.

Mr. Canaday has been appointed Advisor to the Chairman of the NME Munitions Board on matters pertaining primarily to the industrial planning programs of the Board.

Chevrolet Passes Milestone with 22 Millionth Vehicle

Despite the shutdown for model changeover early this year, GM's Chevrolet Motor Div. turned out a million vehicles within the last 10 months preceding June 1. The milestone brought total Chevrolet production to 22 million vehicles, 3 million of which were produced since the end of the war. Of the thirteen Chevrolet assembly plants, the St. Louis unit currently heads the list with a total of 3,350,000 units. Others in total standing are: Tarrytown, N. Y., 3,000,000; Flint, 2,150,000; Janesville, Wis., 2,100,000; Norwood, O., 1,800,000; Oakland, Calif., 1,600,000; Bloomfield, N. J., 1,500,000; Kansas City, 1,500,000; Buffalo (prewar) 1,300,000; Canada, 1,300,000; Atlanta, 1,100,000; Baltimore, 1,100,000; Los Angeles (newest

MACK TO SWEDEN

Bound for Sweden, this new 50-passenger Mack bus is 96 in. wide, 118 in. high, and weighs about 22,000 lb ready for service. Powered by a Mack six-cyl, 150 hp Diesel engine, the new bus features an all-hydraulic system for steering, brakes, torque converter controls, door controls, windshield wipers, radiator shutter, ventilation dampers, and throttle control.

NEWS *of the* AUTOMOTIVE INDUSTRIES

Wide World

HANOVER'S HANDSOME HANSA

Exhibited at the recent trade fair in Hanover, Germany, this automobile produced by a Bremen manufacturer is called the Hansa 1500. Powered by a four-cyl engine, it is said to have a top speed of 72 mph and a gasoline economy of about 24 mpg.

assembly plant, opened Feb., 1948), 80,000. In May, Chevrolet production hit the highest mark in 20 years, 146,549 cars and trucks, and missed breaking its all-time record, set in May, 1929, by only 3500 units.

Willys Gets $12 Million Army Contract

Amounting to more than $12 million, contract for Jeeps and concurrent spare parts has been awarded by the U. S. Army to Willys-Overland Motors. Replacement of military vehicles now in service is necessary, Army Ordnance spokesmen said, since the average age of such vehicles is six years, and by the very nature of their rigorous service, they are shorter lived than their civilian counterparts.

New GMC 220-hp Gasoline Engine in Production this Fall

Although GMC is announcing details of its new 707-cu in. gasoline engine, the power plant will not be in production until October or November. It will have a rating of about 220-hp and will be offered for those who want a gasoline engine of about the same power as the company's similarly sized Diesel. GMC also has a 300-hp aluminum Diesel engine under development, but it is expected that it will be about 18 months or more before it will be ready for production.

GM May Production Hit All-Time High

GM, which consistently since the end of the war has had trouble in reaching capacity production because of materials shortages, finally has crashed through the ceiling with a new all-time monthly production record. During May the corporation turned out 265,280 passenger cars and trucks in its United States and Canadian plants, thereby surpassing the previous high of 262,628 units produced in April, 1941. Of the total May production, passenger cars represented 219,892 units, and trucks 45,388. Up to the first of June, GM had built 1,087,335 passenger cars and trucks, compared with 898,293 for the same period last year. Contrary to the general industry trend, which has seen truck production fall behind last year, GM output of commercial vehicles for the first five months of 1949 totaled 240,553, representing an increase of 27,285 units over the same period last year.

Kurtis Convertible to be Available in Kit Form

Automobile enthusiasts will be able to buy the new Kurtis convertible in kit form from Kurtis-Kraft, Inc. The kit price is expected to be about 30 to 35 per cent below the cost of the assembled car. The company now has in production a limited number of the Kurtis sports cars to be completely factory assembled at the company's Los Angeles plant. Plans call for future cars to be available either fully assembled or in kit form. The assembly price is approximately $3,990, FOB, Los Angeles.

The prime appeal of the kit arrangement, Frank Kurtis, president, told AUTOMOTIVE INDUSTRIES, is that the car owner can add his own ideas to attain speed, power, and the feeling of owning a "different" automobile. Of still greater appeal to enthusiasts will be the opportunity to incorporate modifications of their own choosing. The

NEW TRUCK REGISTRATIONS*

Arranged by Makes in Descending Order According to the 1949 Three Months' Totals.

MAKE	March 1949	February 1949	March 1948	THREE MONTHS Units 1949	Units 1948	Per Cent of Total 1949	Per Cent of Total 1948
Chevrolet	33,229	25,105	26,812	80,205	71,463	36.27	29.95
Ford	14,550	11,418	20,662	37,958	42,737	17.17	17.91
Dodge	10,578	8,238	11,606	27,417	28,295	12.40	11.86
International	8,584	7,091	12,840	23,278	33,097	10.53	13.87
G. M. C.	7,445	5,005	5,949	17,295	16,395	7.82	6.87
Studebaker	5,010	4,035	4,732	13,479	12,656	6.10	5.30
Willys-Truck	2,335	2,107	1,894	6,592	4,357	2.98	1.83
Willys-Jeep	1,725	1,463	4,038	4,673	11,433	2.11	4.79
White	797	662	1,088	2,172	3,076	.98	1.29
Diamond-T	564	500	939	1,588	2,549	.72	1.07
Mack	555	456	920	1,525	2,808	.69	1.18
Reo	463	373	1,076	1,206	3,138	.55	1.32
Divco	336	238	517	854	1,554	.39	.65
Autocar	189	126	216	541	789	.24	.33
Brockway	127	133	328	424	949	.19	.40
Federal	152	107	509	378	1,320	.17	.55
Crosley	103	106	249	324	581	.15	.24
F. W. D.	38	43	67	114	267	.05	.11
Kenworth	42	30	33	102	98	.05	.04
Sterling	14	16	49	53	106	.02	.04
Pontiac	12	5		20		.01	
All Others	317	280	284	927	950	.41	.40
Total	87,165	67,537	94,806	221,125	238,618	100.00	100.00

* Data from R. L. Polk & Co.

buyer will have a choice of engines, springs, and be able to make certain design changes. Assembly of the kit is simplified, with no machine work necessary and only hand tools required to do the job. An instruction booklet will be available and a unique wiring loom will facilitate the wiring installation. Kurtis-Kraft is considering entering the foreign market with the new car.

Army Planning Increase In Truck Purchases

Army Ordnance is planning to increase its purchases of 2½-ton 6 x 6 and lighter trucks. The reason is that money appropriated for five-ton models cannot possibly be committed for by the end of the current fiscal year, and if not used would revert to the Treasury. The Army is still standing pat on its requirement of 24-volt ignition for all Army vehicles.

Horwitz Resigns as Playboy Trustee

Louis Horwitz, president, Playboy Motor Car Corp., has resigned as additional trustee in the reorganization proceedings pending in Federal Court. Judge John Knight had named Mr. Horwitz as an additional trustee with Allen H. Gardner, who was designated as disinterested trustee. The corporation filed a reorganization petition April 15 under the Federal Bankruptcy Act. The resignation of Mr. Horwitz leaves Mr. Gardner as sole trustee in full charge of the corporation's assets until a plan of reorganization is accepted.

Wide World

LIGHT HEADED MOUSE

Powered by a four-cyl engine which has an aluminum head, this new Fiat in the Topolino (literally "little mouse") line is said to have a cruising speed of about 60 mph and a gasoline economy of 50 mpg. This is a showroom view of the new model which will reportedly cost about $1125 at the factory.

Ford Offers Air Brakes on Large Truck Line

Ford has made air brakes available as optional equipment on its F-8 heavy duty truck only. They will be available on either single or two-speed axles. The air brake unit is supplied by Bendix-Westinghouse. Ford is going to offer service components, but will undertake no major reconditioning. For major maintenance, an exchange unit deal will be available through Bendix-Westinghouse distributors located throughout the country.

Austin of England to Stay in American Market

L. P. Lord, chairman and managing director, Austin Motor Co., Ltd., (England) settled a current question in New York City recently when he stated flatly that whether or not other British automobile manufacturers plan to withdraw from the American market as a result of the current recession, Austin certainly does not plan to do so. Mr. Lord declared that when he came to launch Austin's sales drive 18 months ago he said that they were entering the American market to stay, that replacement parts would be sent over in advance of the cars, and that they would ship enough spares to be available anywhere in the United States within 24 hours. He emphasized that they have kept that promise to the fullest.

NEW PASSENGER CAR REGISTRATIONS*

Arranged by Makes in Descending Order According to the Three Months' Totals.

MAKE	March 1949	February 1949	March 1948	THREE MONTHS Units 1949	Units 1948	Per Cent of Total 1949	Per Cent of Total 1948
Ford	69,858	52,782	42,405	177,831	129,951	19.94	15.54
Chevrolet	71,389	41,275	66,465	142,836	174,966	16.01	20.92
Plymouth	28,084	22,692	29,364	86,261	81,108	9.67	9.70
Buick	29,685	25,136	24,726	80,858	62,800	9.07	7.51
Pontiac	25,898	14,480	23,470	53,097	58,046	5.95	6.94
Oldsmobile	20,733	15,924	18,377	50,553	43,009	5.67	5.14
Dodge	15,679	13,496	18,599	49,056	53,414	5.50	6.39
Hudson	13,110	10,146	10,967	34,293	24,469	3.86	2.93
Studebaker	14,389	10,613	13,434	34,234	34,012	3.84	4.07
Mercury	13,793	9,259	8,454	32,323	27,885	3.62	3.33
Nash	11,136	8,124	10,490	27,197	27,186	3.05	3.25
Chrysler	9,399	6,897	6,997	25,388	23,806	2.85	2.85
De Soto	8,185	5,549	6,945	21,409	18,601	2.40	2.22
Packard	8,465	5,879	5,884	20,466	13,585	2.29	1.62
Cadillac	6,647	5,509	3,665	18,464	9,817	2.07	1.17
Lincoln	3,433	2,733	1,133	9,773	4,099	1.10	.49
Kaiser	3,773	2,537	7,795	9,664	21,706	1.08	2.59
Frazer	2,068	1,556	4,657	5,767	14,655	.65	1.75
Willys	2,139	1,552	2,821	5,467	6,552	.61	.78
Crosley	1,253	972	1,965	3,291	4,815	.37	.58
British Ford	541	458	....	1,554	....	.17	....
Austin	231	204	803	647	1,499	.07	.18
All Others	496	445	234	1,434	428	.16	.05
Total	360,584	258,218	311,650	891,963	836,409	100.00	100.00

* Data from R. L. Polk & Co.

NEWS *of the* AUTOMOTIVE INDUSTRIES

Willys Earnings Down from Year Ago

Earnings of Willys-Overland Motors for the six months ended March 31 were $2,797,310. For the same period a year ago, net profit was nearly $3.2 million. Delmar C. Roos, newly elected first vice president, reported that retail sales during April showed an increase, and that dealers stock declined 12 per cent, bringing the total reduction in inventories since February to 20 per cent.

GM Chairman Sees Sales Drop in Late '49

Even though GM is currently enjoying the greatest demand of its products of any automobile builder, it is looking for a drop from present high production levels the latter part of this year. Alfred P. Sloan, board chairman, told stockholders recently that by that time automotive products should be in ample supply, and that for the first time since the end of the war the seasonal trend will be felt in a reduction in consumer sales, requiring an adjustment downward of production to bring field stocks into better balance with the seasonable level of consumer deliveries. He made it clear that GM at this time has no plans for bringing a smaller car into production, but that study of the subject is continuing just as it has for many years past.

Budd to Make Dies Boosting Italian Scooter Output

An indication of reviving Italian industry is seen in the recent announcement that Piaggo & Co. of Italy is completing arrangements with the Budd Co. for the engineering work, dies, jigs, and stampings necessary to increase by one and one-half times the production of Piaggo's Vespa division. The Vespa is a motor scooter now being built at the rate of 100 a day.

Automotive Industries Editorial Index Available Soon

Covering all issues from Jan. 1, 1949 to June 15, 1949, inclusive, the AUTOMOTIVE INDUSTRIES Editorial Index will be issued July 10th. The 20-page index provides a quick summary of all of the editorial articles, listed alphabetically by subject, along with page numbers and dates of the issues in which they appear. It also includes a crossindex by author and company mentioned. The printing of the index will be limited. It is priced at 50¢ a copy, and may be ordered now.

Ford of Canada Reveals Cost of Union Demands

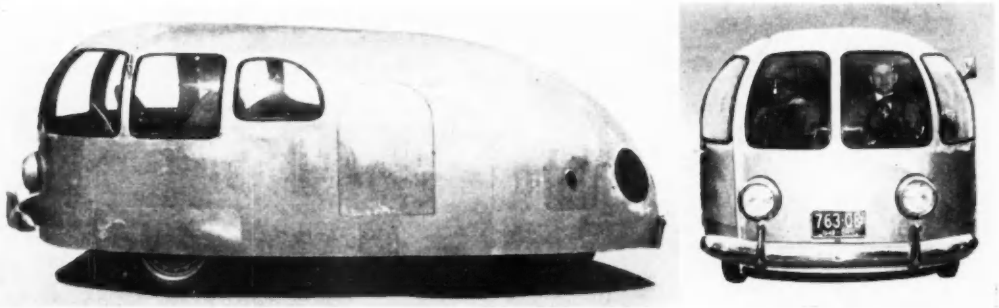
In a hard-hitting letter to its employes, Ford Motor Co. of Canada, Ltd., has stated bluntly that it cannot meet demands for pensions. The union demands call for a pension plan and social security covering hospital, medical, surgical and life insurance benefits and increased paid vacations, more paid holidays and double off-shift premiums. D. B. Craig, company president, said that the demands would cost the company $13 million a year, which would be equal to a wage increase of 46½¢ an hour for each hourly-rated employe. He added that the cost would approximate about $130 for each vehicle produced by the company based on 1948 production. He added that the company never in its history has earned a net profit anything like $13 million, but that the average over the past 20 years has been less than one-fifth that amount. He said that even if the company were to dip into its surplus, that source of revenue would be dried up within three years.

Convert Copolymer Plant for Cold Rubber Production

The complete conversion of the Copolymer Corp.'s plant in Baton Rouge, La., to cold rubber production, was disclosed recently. Said to be the first plant to produce cold rubber commercially, it has a capacity of over 60 million lb annually. The eight tire companies operating the plant are the Armstrong Rubber Co., West Haven, Conn.; Dayton Rubber Co., Dayton, O.; Gates Rubber Co., Denver, Col.; Inland Rubber Corp., Chicago, Ill.; Lake Shore Tire & Rubber Co., Des Moines, Iowa; Mansfield Tire & Rubber Co., Mansfield, O.; Lee Rubber & Tire Corp., Conshohocken, Pa.; Sears Roebuck and Co., Chicago, Ill.

Ford Announces Additions to Truck Wheelbases

When the Ford strike intervened, the company was just preparing to announce three new additional wheelbases in its heavy duty truck series. In the F-7 and 8 series the added wheelbases are 147 and 178 in., bringing the total



ALUMINUM TEARDROP

Built by Anton F. Erickson, assistant supervisor of the engineering laboratory, GM's Moraine Products Div., the Erickson Special is powered by a four-cyl. 60 hp. water-cooled engine centrally mounted in the rear. Featuring three wheels, the car is steered through the single rear wheel. The body of the car is made of aluminum; streamlined in the shape of a teardrop.

to four. In the F-5 and 6 series, the additional wheelbase will be 176 in.

Auto-Lite Nets $2.2 Million in First Quarter of 1949

The Electric Auto-Lite Co. has reported that net consolidated earnings for the first quarter of 1949 amounted to $2,203,853, compared with $2,708,998 for the same period a year ago. Net sales for the first quarter of 1949 were $52,321,459, an increase over the same period a year ago of $2,914,749.

Crosleys Feature New Brake and Cast Iron Block

Included among the new features of Crosleys now being produced are Hydradisc brakes (see photograph on this page), the new Crosley CIBA (cast-iron engine block), valve rotators, and spiral bevel gears driving the overhead camshaft. In making this announcement, Powel Crosley, Jr., president, stated that the adoption of the Hydradisc brakes marks the first time that airplane-type hydraulic brakes have been introduced as standard automobile equipment.

The cast iron engine has the same mechanical specifications and features as did the former fabricated engine and is interchangeable in all respects. As we understand it, all of the component parts are interchangeable, and it should be possible to use parts such as valves, valve springs, pistons, camshaft, bearings, gears, etc., now in field stocks for replacement in the cast iron engine. Accessories such as the water pump, hose connections, etc., are interchangeable and have the same mountings on the new engine.

1949 MOTOR VEHICLE FACTORY SALES FROM U. S. PLANTS*

	Passenger Cars	Trucks	Buses	Totals 1949	Totals 1948
January	326,019	104,599	658	431,276	405,663
February	324,547	101,700	418	426,665	383,002
March	402,402	115,171	545	518,118	492,034
April	436,392	106,212	514	543,118	438,090
Total Four Months	1,489,360	427,682	2,135	1,919,177	1,718,789

1949 FACTORY SALES TO DOMESTIC AND FOREIGN MARKETS

	Passenger Cars		Trucks		Buses	
	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign
January	312,199	13,820	91,282	13,317	618	40
February	310,343	14,204	88,540	13,160	326	92
March	385,834	16,568	99,925	15,246	423	122
April	422,149	14,243	91,808	14,404	494	20
Total Four Months	1,430,525	58,835	371,555	56,127	1,861	274

* Automobile Manufacturers Association.

Allison Develops Turbo-Prop Engine for Navy

GM's Allison Div. has developed a new turbo-prop engine under contract for the Navy. Now flying as the fifth engine in a converted B-17 Boeing "5-engine bomber," it is said to be extremely powerful for its low weight and size, and is reportedly capable of flying the airplane with all four 1200-hp engines cut out.

Stockholders Authorize Hudson Share Boost

The stockholders of Hudson Motor Car Co. have approved a directors' proposal to increase authorized common stock from two million shares to three million, and to set a par value of $12.50 a share. Previously, Hudson stock had no stated par value and was carried on the balance sheet of the company at $12.50. According to a company statement, there are no present plans for issuing any of the additional stock authorized.

GM Appoints New Medical Consultant

The General Motors Corp. has appointed Dr. Max R. Burnell, Flint, Mich., as medical consultant. Formerly medical director of GM's AC Spark Plug Div., Dr. Burnell succeeds Dr. Clarance D. Selby who is retiring after 14 year's service as GM's medical consultant.

Britain Claims to be World's Largest Car Exporter

Despite a drying up of sales in the United States, Britain still claims to be the world's greatest automobile exporter, with a record of 57,500 passenger cars, 23,000 trucks or buses, and 25,500 agricultural tractors sent abroad during the first quarter of 1949. During April, 19,500 passenger cars were exported, this being slightly above the average for the quarter. British manufacturers freely admit that unless production costs can be reduced, they will have difficulty in holding their export position.

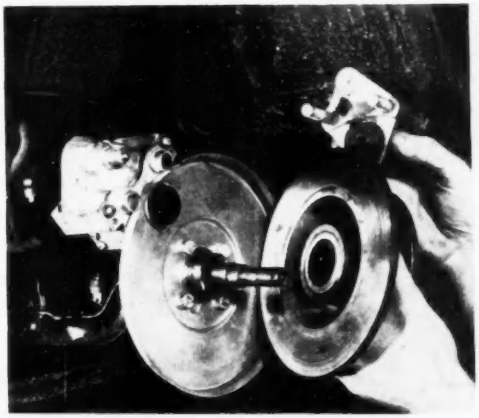
Timken Celebrates 50th Anniversary

In celebration of its 50th anniversary, the Timken Roller Bearing Co., Canton, O., is holding an open house preview for a group of invited guests. The plant tour will include visits to the Timken steel mill and Timken bearing plant.

(*Turn to page 58, please*)

STOPS THE CROSLEY

Now standard equipment on all Crosley cars, the Hydradisc, shown here, a disk-type hydraulic brake, is a direct adaptation of the Goodyear-Hawley aircraft brake. View of dissembled front-wheel brake shows (right) cast-iron disk. Two friction "spots" (one shows through stationary dust pan, the other is being held in right hand) are fixed on opposite sides of the disk. When the brake is applied, these "spots" clamp against the disk under hydraulic pressure.



50th birthday of the company whose products you know by the trade-mark: TIMKEN

SINCE 1899 THE TIMKEN ROLLER BEARING COMPANY HAS BEEN HELPING AMERICAN INDUSTRY GET THE MOST FOR ITS MONEY

NOBODY likes to buy a "pig in a poke". In America you don't have to. You're protected by trade-marks like "TIMKEN".

Registered as a trade-mark in the United States Patent Office, "TIMKEN" identifies products made by The Timken Roller Bearing Company: Timken tapered roller bearings, Timken alloy steels and seamless tubing and Timken removable rock bits.

Experience over the years has shown Timken products to be the finest in their respective fields. And many thousands of men and women are working hard to keep them that way. No wonder it has become a habit throughout industry to look for the trade-mark "TIMKEN". The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

Japan's Automobile Industry Regains Prewar Potential

Special to AUTOMOTIVE INDUSTRIES

TOKYO, JAPAN

THE Japanese automobile industry has been restored to its highest prewar potential. Within three years after the surrender, the Japanese government, with the assistance of the occupying powers, has provided 766 million yen in rehabilitation aid. It is difficult to assess the value of this amount in terms of western currencies because the yen exchange rate slipped during this period from 50 yen to 280 yen per U. S. dollar. In the same period only four other industries received more financial assistance; coal mining, electric power, fertilizers, and iron mines. This appropriation is all the more significant because the three largest makers came out of the war with their plants in tolerable running condition.

It was only nine years before V-J Day that the Japanese government legislated a mass-producing automobile industry into existence and signified its intention to assist qualified applicants. Under the same 1936 law, the output of the American branch plants in Japan (Ford's at Yokohama and GM's at Osaka) was "frozen" at a combined total of about 21,000 vehicles a year, while Japanese firms capable of producing 5000 Ford and Chevrolet type chassis a year or more were to qualify for a government charter carrying special privileges. These included exemption from business profits tax for three years, and from import duties on machine tools and other equipment. Two firms qualified in 1937—the Toyota automobile company, and the Nissan automobile company. They are still in the forefront, although several unchartered firms took up automobile production before the war.

The now worldwide dollar shortage then bit into the restricted assembly volume of the American firms and put a stop to imports of assembled cars. The Japanese automobile industry faced its first serious test in the summer of 1941 when the anti-Axis powers suspended all trading with Japan, which meant that the supply of tools and assembly components on which the makers still depended was suddenly cut off. It is of historical interest that Japan's maximum production of 43,491 standard cars and trucks in 1941 was never again duplicated. However, this was due largely to the conversion of automobile plants and subcontracting shops to aircraft production. The output of motor vehicles tapered off rapidly, totaling 6724 standard chassis and 715 small cars in 1945.

Although motor registrations in 1945 also reached a long-time low (73,743 units), by 1947, 124,290 cars, trucks and buses were back on the road. The major makers resumed production of civilian vehicles almost as soon as the dust of the last bombings had settled down. In spite of continued difficulties, including raw material and power shortages and displacement of skilled operatives, Toyota and Nissan are each assembling 600 standard cars and trucks each month. Automobile Industry Ltd. (formerly Diesel Automobile Ltd.) is turning out an additional 300 vehicles, including 75 Diesel trucks and buses. These figures do not include lighter vehicles, notably the "sanrinsha," Japan's three-wheeled delivery vehicle. The former Mitsubishi Heavy Industries Ltd. aircraft plant at Nagoya has been converted to commercial vehicle production, and its output may soon rival that of the older makers. All told, Japan's production this year may reach 25,000 standard vehicles.

In spite of the widely publicized new "baby car" for the export market, the car, truck and bus chassis of the standard American types are more than ever the mainstay of the industry. In Japan, even before the war, nearly every motor vehicle was put to public, governmental or commercial uses. There were very few middle-class Japanese who could afford a personal small car, such as the Datsun (built by Nissan), and there were even fewer millionaires who drove to their offices or to the golf links in American or English luxury cars. There are now even fewer people who can afford personal cars of either class. Thus the field for the standard car (used as taxi or by government officials) and its truck and bus version has been relatively broadened.

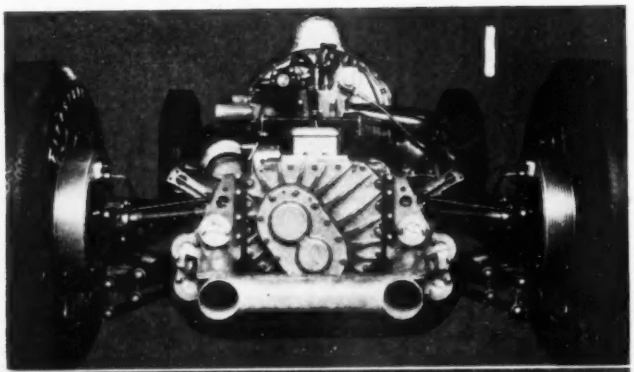
None of the bantam cars has so far reached the quantity production stage, and there is little likelihood that Japan will in the foreseeable future be able to compete in any foreign market, barring the possible use of heavy export subsidies. This applies to large and small cars alike, with the exception of the "sanrinsha," which before the war sold in large numbers in South America and elsewhere.

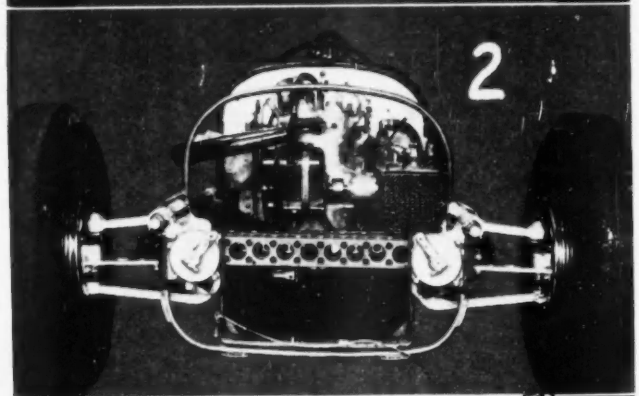
Even prewar, Japan just managed to produce the small Datsun at a cost equivalent to the American factory price of a big car. The direct labor factor in the Japanese cost of production was then relatively slight and depreciation of fixed assets was the most important item next to raw material cost. This was due to the employment of American mass production tools at a fraction of their economic capacities. Today, labor cost has become the most important item, so much so that goods tend to become the less competitive in foreign markets the more labor and the less

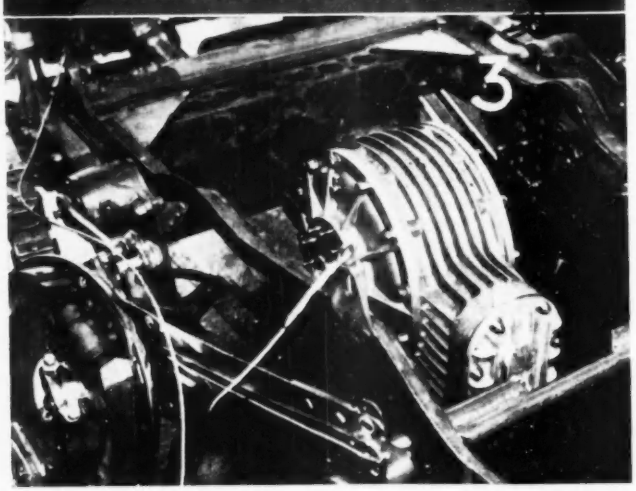
(*Turn to page* 100, *please*)

By
John
Bond

New Records







THE Indianapolis 500 mile race is now history, and once again new records have been set. Bill Holland's winning average of 121.327 mph is a speed which was not unexpected in view of the extremely high qualifying speeds made this year, where the slowest car turned in no less than 125.799 mph.

An outstanding event occurred during the time trials which should not go unnoticed; namely, the record for four laps set by Johnny Parsons in the Kurtis-Kraft Special owned by Frank Kurtis and Ed Walsh. The speed was 132.900 mph and seems remarkable in comparison with the track record of 133.944 mph made by the late Ralph Hepburn in 1946. Parson's speed is the highest ever turned in by a rear wheel drive car, and also the best ever made by an unsupercharged engine. Hepburn's Novi, on the other hand, was a front wheel drive which feature alone is usually conceded to give five mph more lap speed, and of course the Novi's supercharged engine gives perhaps 50 per cent more bhp than the big four in the Kurtis-Kraft.

Aside from the new record speed for the 500 miles, one of the most interesting developments is the fact that only 12 of the 32 cars which started finished the race,

1. *Rear view of N. J. Rounds' new rear-engine car which has a tubular frame and independent suspension at all four wheels with torsion bar springing. Radiator and fuel tank are located at front of the car.*

2. *Front view of Norm Olson's car, a newcomer at Indianapolis. Its chassis and suspension were copied from the Italian Maserati. This car is exceptionally low, having only four in. ground clearance.*

3. *Rear view of chassis of the Norm Olson car showing the quick-change rear axle and rear suspension with leaf spring. The chassis frame kicks down and passes below the axle.*

at Indianapolis

and all 12 were powered by four cylinder Meyer and Drake (Offenhauser) engines.

The tough luck of the two Novi Specials was a big disappointment to the fans as well as owner Lou Welch, builder Bud Winfield, and drivers Nalon and Mays. Nalon's crash was apparently due to being forced out of his normal "groove" in order to pass a slower car. Mays in the other Novi came to a stop on the back stretch with supercharger trouble.

Lee Wallard led the race after Nalon and Mays were forced out, driving the Maserati which won in 1939 and 1940 for Wilbur Shaw, and was also driven by Ted Horn in later years, finishing third in both the 1946 and 1947 races. The Maserati was forced out apparently by an oil leak.

At one time it appeared that Lou Moore's stable was about to do the impossible with Holland leading and Rose second in the front wheel drive cars, and Connor third in the "baby" Blue Crown which has rear wheel drive intended for use on dirt tracks. Rose, however, was forced out with a broken magneto retaining strap, and Parsons passed Connor to get in between the Blue Crown team members for second place.

One outstanding new car appeared this year, the rear engined (a big four) rear drive built by Nat Rounds. It arrived too late for sufficient practice, and did not qualify though several laps were turned at 124 mph. Much is expected of this car next year.

The Kurtis-Kraft mentioned previously is the same car first built and entered last year with DeDion type rear suspension. For the 1949 race this rather elaborate system was scrapped and a new rear axle assembly of conventional race car type with quick change gears installed. Springs are torsion bar all around as before, and although the car is several inches higher, its speed of 132.900 mph. speaks for itself.

Several more cars this year fitted larger wheels of 19 or 20 inches, which of course have many advantages for the Indianapolis track.

Despite pre-race rumor, only two cars—Howard Keck Special and Agajanian Special—ran the full distance non-stop.

Pit work was very poor with the possible exception of Bill Holland's 46-second stop for a right front tire and fuel. This compares with under 30 seconds often achieved in European road races for four tires changed and 70 gallons of fuel added.

Many of the slower cars were guilty of baulking the faster ones, due at least in part to poor handling qualities of obsolete chassis running too fast to move over and out of the "groove" for such drivers as Nalon, Mays, Holland, Rose and Parsons.

As a result of the higher speeds attained nearly every year, there is some talk of reducing engine displacement in order to limit the speed to some figure closer to that for which the track is designed. However, a rough check with car owners quickly showed that

How They Finished in the 33rd Indianapolis 500-Mile Race

	Driver	Car	Average Speed
1.	Bill Holland	Blue Crown Special	121.327 mph
2.	Johnny Parsons	Kurtis-Kraft Special	119.785 mph
3.	George Connor	Blue Crown Special	119.595 mph
4.	Myron Fohr	Marchese Special	118.791 mph
5.	Joie Chitwood	Wolfe Special	118.757 mph
6.	Jimmy Jackson	Howard Keck Special	117.870 mph
7.	Johnny Mantz	Agajanian Special	117.601 mph
8.	Paul Russo	Tuffy's Offy Special	111.861 mph
9.	Walt Brown and Emil Andres	Tuffy's Offy Special	(flagged off)
10.	Norman Houser	Troy Oil Co. Special	(flagged off)
11.	Jim Rathman	Pioneer Auto Special	(flagged off)
12.	Troy Ruttman	Carter Special	(flagged off)

Note: All above engines – four-cyl

Other Starters

Travis (Spider) Webb, Grancor Special, broken transmission (failed to start).

George Lynch Auto Shippers Special, wrecked at 5 miles.

Charles Van Acker, Redmer Special, wrecked at 27½ miles.

Duke Nalon, Novi Mobil Special, wrecked at 55 miles.

Sam Hanks, Love Machine and Tool Special, ran out of oil at 50 miles.

Manuel Ayulo, Sheffler Offenhauser Special, broken connecting rod at 55 miles.

Rex Mays, Novi Mobil Special, engine trouble at 120 miles.

Lee Wallard, Maserati Special, clutch trouble and fuel leak at 137½ miles.

Jack McGrath, City of Tacoma Special, broken oil pump at 100 miles.

Bayliss Leverett, Wynn's Oil Special, differential trouble at 130 miles.

Fred Agabashian, Maserati Special, overheated engine at 100 miles.

Jackie Holmes, Pat Clancy Special, broken drive shaft at 160 miles.

Bill Cantrell, Kennedy Tank Special, broken drive shaft at 240 miles.

George Fonder-Mel Hansen, Brady Special, broken valve at 290 miles.

Hal Cole, Grancor Special, mechanical trouble at 292½ miles.

Johnny McDowell, Iddings Special, stalled at 357½ miles.

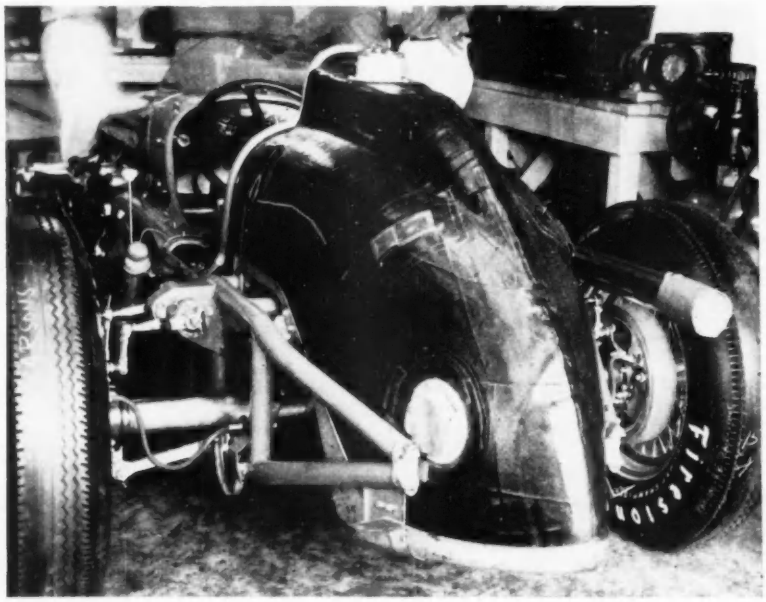
Duke Dinsmore, Norm Olson Special, broken rear radius rod at 435 miles.

Bill Sheffler Offenhauser Special, mechanical trouble at 400 miles.

Mack Hellings, Don Lee Special, mechanical trouble at 400 miles.

Duane Carter, Belanger Special, spun and damaged steering gear at 457½ miles.

Mauri Rose, Blue Crown Special, stalled at 480 miles.

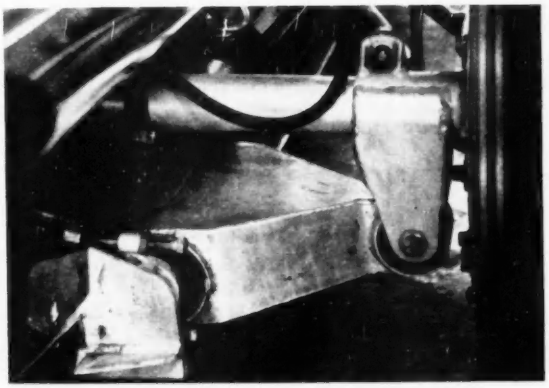


4. *Shown here is the new construction of the Kurtis Kraft car which is equipped with torsion bar springing. Adjusting arms at the stationary ends of the front and rear torsion bars provide for equalization at each wheel. The rear axle now is a conventional straight-through type instead of the DeDion type which was used in last year's race. The 270 cu in. Meyer Drake engine is suspended at four points on Lord mounts.*

most of them are very much against any change in rules which would involve the expense of a new engine. Present regulations limit the engine displacement to 4.5 litres (275 cu in.) unsupercharged, or 3 litres (183 cu in.) supercharged. These figures were in agreement with the F. I. A. standard for international competition before the war.

However, experience in Europe showed that a supercharged engine of only 1.5 litres (91.5 cu in.) would be necessary to give the unblown engine an equal opportunity, and as a result the present Indianapolis rules are not now in agreement with international regulations.

Nevertheless, we are faced with the fact that the 1949 race has again shown decisively that even with the opportunity of running a supercharged engine of twice the size allowed in Europe, the big unsupercharged engine is still a "better bet" for the Indianapolis event.



5. *Rear suspension of the Bowes Seal Fast Special. Rubber in torsion is employed at front and rear wheels. Both of the Bowes Seal Fast cars have this suspension system.*

A trend away from building new cars designed only for the Indianapolis track is more evident this year. Lou Welch, owner of the two Novi cars, stated after the race that he would not run again unless the prize money is increased and this seems to be the general feeling of car owners. To design and build one or two cars capable of winning the race is certainly very expensive and as a result "combination" cars, designed primarily for the AAA dirt track circuit are found in increasing numbers at Indianapolis. These cars do not have much chance of winning the 500 against such specials as the Novis, the Blue Crowns, or the Maseratis, but they do have a chance of winning enough prize money to break even for the season's running.

Non-Lubricated Spring Shackles of Metal Type

Vauxhall Motors in England announces the adoption of non-lubricated spring shackles on all models but one. This has been done by the use of case-hardened heavily chromium-plated shackle pins, with steel bushings in place of bronze and a clearance between pin and bushing of .035 to .040 in. On most models this reduces the lubrication points from 27 to 15.

Major Features of Studebaker's Borg-Warner Automatic Transmission

THE Detroit Gear Division, Borg-Warner Corp., in collaboration with the Long and Borg & Beck Divisions, has developed an automatic transmission plus torque converter for passenger cars. As announced (see AUTOMOTIVE INDUSTRIES, June 1, page 17), this transmission has been adopted by Studebaker for use in models to be released for production later this year.

The torque converter comes into play with first gear, second and reverse gear. Direct drive is obtained through a hydraulically operated friction clutch which completely by-passes the torque converter, thereby eliminating fluid slippage and frictional losses of the transmission gearing. This type of planetary transmission provides a fluid start with locked-up direct drive.

The ratios obtainable in the gear box plus torque converter give complete coverage ranging from maximum low gear performance through intermediate gear requirements blending into direct drive with low engine speed for cruising range. In fact, performance is considered equivalent to a conventional three speed transmission plus overdrive. A passing gear is readily obtainable at the will of the driver as is a coasting gear for engine braking for descending grades.

Full throttle acceleration is available in direct drive at very low car speeds. The feature is desirable, particularly in traffic operation, since unnecessary shifting and unpleasant engine speed-up noise are eliminated. Direct drive offers very low engine speeds due to the lower axle ratio used with this unit.

The maneuver between low and reverse for "rocking" the car can be made rapidly and smoothly by moving the control lever quickly from low to reverse. This is feasible because only a valve is moved during the operation, thus permitting smooth and prompt engagement.

At the option of the car manufacturer this transmission can be arranged to start either in low or in second gear. In either case the progression to higher ratios is fully automatic and said to be scarcely perceptible.

When arranged to start in second gear, low is used as an emergency gear and when the manual shift lever is moved to this position the transmission will remain in low gear. This gear is used for pulling heavy loads, and ascending or descending steep grades.

The automatic shifting range varies with the position of the accelerator pedal. With light throttle the shifts progress at medium car speed while with more throttle the shifts progress at higher car speeds.

A kick-down from direct drive position is provided for added acceleration. This kick-down position is a resistance under the accelerator pedal which is felt by the driver. When the throttle overcomes this resistance a down shift is effected automatically into second gear. If this throttle position is maintained, automatic upshift into direct drive takes place at 60 mph. The driver has complete control of this down shift or passing gear up to 50 mph.

The control system is of simple design. Shift speeds and the quality of shifts are uniform and consistent under all conditions. This is assured by the action of a mechanical governor which is not affected by temperature changes. Also no timed nor over-lapped shifts are used, thereby eliminating any effects from oil temperature and viscosity change.

The manual shift lever has five positions as follows:

"P"—Park position. This is a mechanical lock for parking the car on any grade. It is positive in action and easily released.

"N"—Neutral.

"F"—Forward (high range). Starting in second gear with torque converter and automatically shifting into direct. Shift speed change is determined by amount of throttle opening.

"L"—Low range. Starting in low gear with torque converter and shifting no higher unless the manual shift lever is moved to "F" (forward high range). This range also is used for engine braking and can be secured by shifting manually up to 50 mph under all conditions, providing the car is in forward motion.

"R"—Reverse.

The engine can be started only when the manual shift lever is in "P" or "N" positions. No auxiliary oil cooler is necessary.

Cadillac Engine Problems

By H. F. Barr,
Staff Engineer,
and E. N. Cole,
Chief Engineer,
Cadillac Motor Car Div., General Motors

DURING the development of the 1949 Cadillac engine, many specific projects were initiated to improve the quality and durability of components. The following are some of the most interesting problems encountered in this development work.

To minimize piston slap and uneven loading of the skirt thrust surfaces during the power cycle, an optimum piston pin offset of 1/16 in. toward the major thrust side was selected. Fig. 1 illustrates the action during the period of thrust reversal. Tests with the piston pin on center indicated a very high unit thrust loading at the top of the skirt. This coupled with an instant change of the piston from the minor to major thrust side of the bore induced audible piston slap under some conditions. As the explosion load increases near top center the 1/16-in. offset shown produces a correcting moment to the piston head which lowers the maximum unit thrust reaction at the top of the skirt. The piston requires a 20-deg crank motion from 15 deg btc to 5 deg atc, to complete a very slow thrust reversal action. This construction causes the lower or close clearance edge of the skirt to contact the major thrust side of the bore first to further reduce slap tendency.

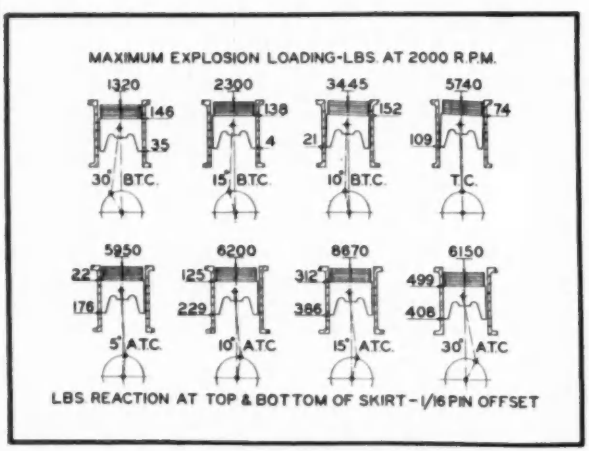


Fig. 1—1949 piston thrust analysis

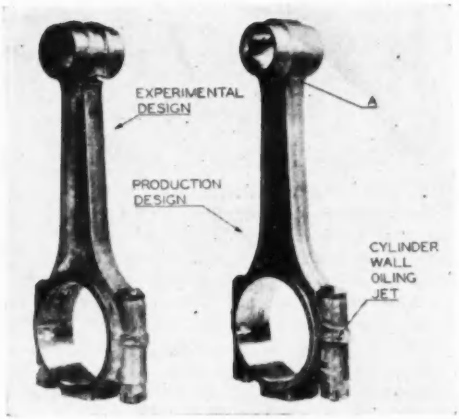


Fig. 2—Connecting rod development

Connecting rod fatigue tests were started early in the development program to determine the durability of this part before actual use in an engine. The upper ends were tested first with the tension load equivalent to the reciprocating load at 4500 rpm plus a 10 per cent safety factor or 2400 lb. The compression loads were based on the maximum explosion pressure at eight to one compression ratio plus the 10 per cent factor or 10,800 lb. Maximum weight control stock was removed around the upper end so that sections were at a minimum. The original design as shown on the left side of Fig. 2 failed at the upper end in 640,000 cycles. Only one failure was experienced with the final design shown on the right side of the figure and that occurred at 8,615,000 cycles. The principal changes that produced this improvement are: Redesign of the forging to give a more gradual section change between the column and the piston pin

and How They Were Solved

Connecting Rod Bearing Durability

4250 R.P.M. Bearing Loads	1948	1949
Maximum Inertia Load—Lbs.	5220	3830
Projected Bearing Area—Sq. In.	2.49	1.96
Unit Bearing Load—P.S.I.	2050	1960
2000 R.P.M. Open Throttle Bearing Loads		
Net Bearing Load—Lbs.	5600	7870
Unit Bearing Load—P.S.I.	2250	4000

boss; development of a constant central section around the piston pin end by using hollow milling concentric with the hole for weight control; termination of the profile cut concentric with the piston pin hole so that the flash line of the forging is removed in the most critical area. This removes scratches caused by the trimming die. Cutter marks that result are normal to the line of maximum stress.

The lower end of the rod was tested at a load of 4400 lb in tension and 10,800 lb in compression, the tension load was based on the combined reciprocating and centrifugal loads calculated at 4500 rpm plus the 10 per cent factor. With full weight control stock removed at the lower end, no failure was experienced in 10,000,000 cycles. Cadillac engine test experience indicates that rods are satisfactory when no fatigue failures occur under 5,000,000 cycles with this test procedure.

An adequate supply of oil on the cylinder walls immediately after a cold start can be provided by spraying a fine stream of oil from the connecting rod at the proper time. In a V-type engine the best trajectory of the oil stream can be obtained by designing each rod to oil the corresponding cylinder on the opposite bank. In this engine the hole is formed by a milled cut across the face of the cap and a counterbore in the cap around the bolt hole. The jet location avoids stress raisers in the highly loaded tension section of the rod.

The path of the oil stream was checked on a cutaway engine using stroboscopic light. Fig. 3 shows the observed trajectory of 10,000 second viscosity oil at 10 deg increments of crankshaft angle at 700 rpm. It can be seen that the maximum height of the trajectory occurs after the jet orifice passes registration with the hole in the crankpin for each cylinder, and that delivery continues for as much as 90 deg past registration. In this engine the jets supply ample lubrication on the upper sides of the cylinders which are the critical areas, while gravity then supplies oil to the lower sides. At speeds above 1000 rpm the oil stream is completely broken up and lubrication to the entire area is ample.

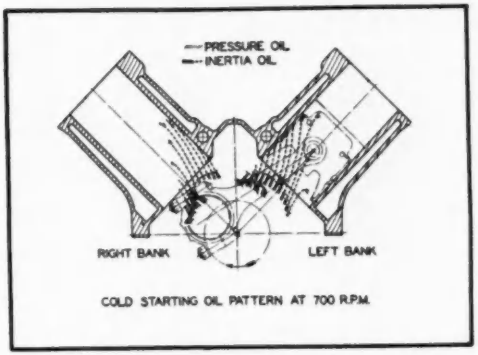


Fig. 3—1949 engine cylinder wall lubrication

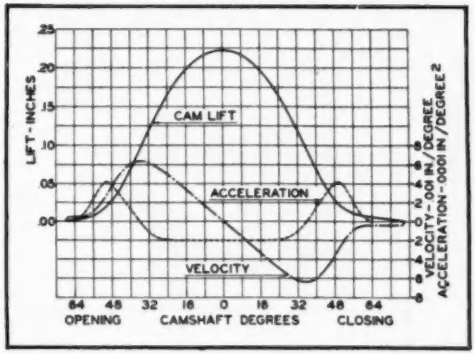


Fig. 4—Cam design characteristics

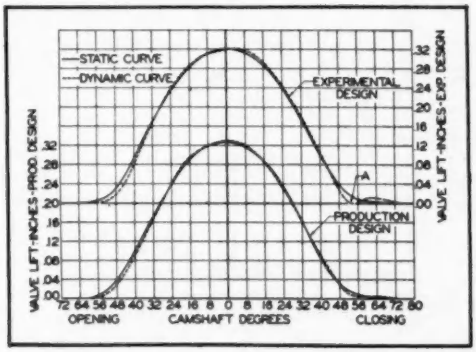


Fig. 5—Dynamic valve lift comparisons at 4250 engine rpm

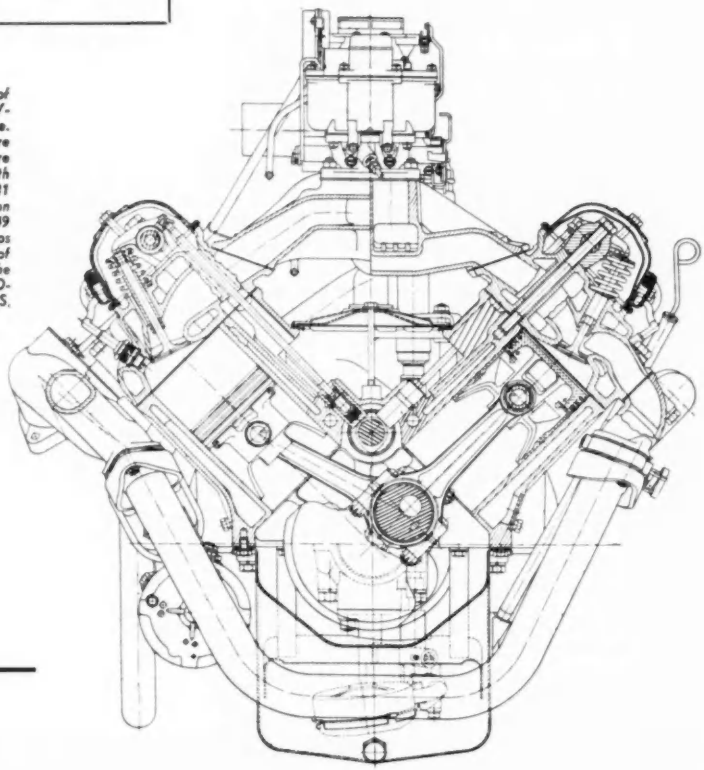
Detailed Weight Comparison of Cadillac 1948 and 1949 Engines

(Lb) (Standard Transmission Engines)

	1948	1949	Diff.
Cyl. Block and Crankcase	303.152	191.740	−111.412
Cylinder Heads	72.243	93.841	+ 21.598
Clutch and Flywheel Housing	39.352	30.665	− 8.687
Crankshaft	92.473	61.643	− 30.830
Crankshaft Balancer	9.417	9.446	+ .029
Flywheel	50.304	33.413	− 16.891
Conn. Rods, Pistons and Rings	31.364	26.937	− 4.427
Oil Pan	9.866	10.704	+ .838
Oil Pump and Drive	6.029	4.796	− 1.233
Oil Distribution System	.855	.087	− .768
Oil Filler	.865	2.305	+ 1.440
Oil Level Indicator	.132	.866	+ .734
Engine Vent System	4.541	3.050	− 1.491
Engine Front Covers	12.264	1.476	− 10.788
Fan and Drive	9.920	5.497	− 4.423
Water Pump and Drive	12.796	16.018	+ 3.222
Engine Thermostat	1.468	2.558	+ 1.090
Intake and Exhaust Manifolds	64.370	52.216	− 12.154
Carburetor	8.518	8.372	− .146
Air Cleaner and Silencer	8.181	6.960	− 1.221
Fuel and Vacuum Pump	6.778	5.694	− 1.084
Power Plant Mountings	6.908	5.576	− 1.332
Clutch Assembly	22.468	22.468	
Camshaft and Drive	47.367	27.780	− 19.587
Valve Rocker Arms, Shafts and Covers		14.849	+ 14.849
Generator	25.308	22.848	− 2.460
Starting Motor	28.307	28.523	+ .216
Distributor	7.617	5.732	− 2.885
Ignition Coil and Wires	3.966	5.047	+ 1.081
Total Engine, Dry	886.915	699.107	−187.808
Radiator (Core and Tank)	40.000	25.585	− 14.415
Total Engine and Radiator, Dry	926.915	724.692	−202.223
Oil	13.300	9.500	− 3.800
Water	52.150	37.548	− 14.602
Total Engine and Radiator, Wet	992.365	771.740	−220.625

High speed connecting rod bearing life has been extended due to the lower inertia forces and other design features of the 1949 engine. A tabulation of the bearing loadings used in the 1948 and 1949 engines is shown in Table 1. Note the reduction in inertia load due to the lighter parts and shorter stroke. Also note the high upper half unit bearing load at 2000 rpm open throttle on the 1949 engine. Durex type 100 A bearing shells are used in both engines, but the oil holes for cylinder wall and piston pin lubrication have been eliminated from the upper shell in the 1949 design. This is a major factor in increased bearing life due to the non-interrupted oil film which exists under the rod column at the instant of maximum explosion load application.

Improvement in valve gear performance was made after a dynamic valve motion study was conducted which resulted in a new cam design, Fig. 4. Shown here are the cam lift, velocity and acceleration values which were finally developed. The cam lift is 0.222 in. with 0.0064 in. per deg maximum velocity and 0.0004 in. per deg squared maximum acceleration on both the opening and closing sides. Ramp rate is 0.0004 in. per deg with 0.002 in. opening and 0.006 in. closing ramp heights. Increase in rigidity of the rocker arm section and use of a heavier 9/32 in. diameter solid push rod eliminated the valve seating at high velocity on

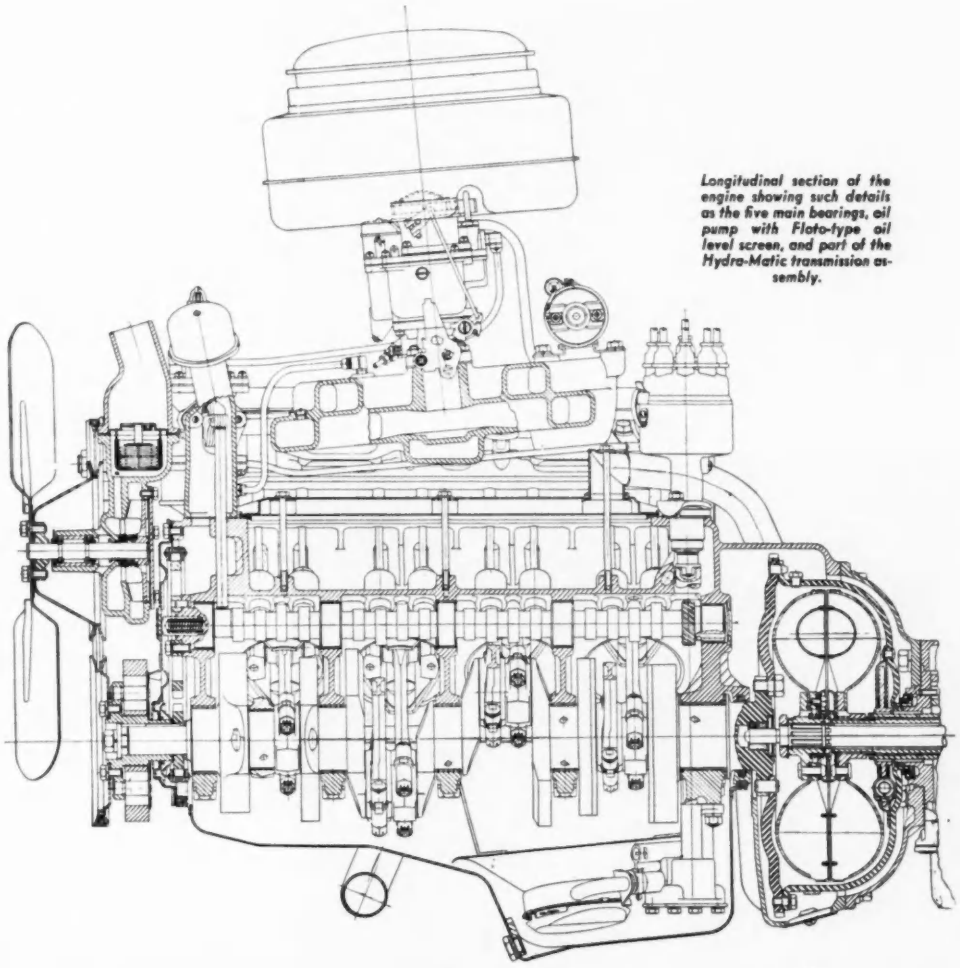


Transverse cross section of the Cadillac 90-deg, V-eight, valve-in-head engine. Combustion chambers are machined all over to assure uniform form and size. With a piston displacement of 331 cu in. and a compression ratio of 7.50 to 1 the 1949 Cadillac engine develops 160 hp. A description of this engine appeared in the Nov. 1, 1948 issue of AUTOMOTIVE INDUSTRIES, page 34.

the closing ramp. A valve spring was developed for a lower rate to reduce cam nose loading. Also the natural frequency was raised to insure valve motion control in the high speed range without the use of surge dampeners.

Fig. 5 shows the improvement made in the dynamic lift curve at 4250 engine rpm with the changes noted. In the upper plot is shown the action obtained with the original parts and the severe misbehavior resulting by comparing the dynamic lift curve with the static curve. At "A" on the closing side the mechanism has deflected, permitting the valve to strike the seat prematurely and bounce severely before finally seating. In the lower curves the action of the redesigned parts is shown, with the new cam contour, new valve spring, and greater rigidity in the push rod and rocker arm. With hydraulic tappets, the cam contour and dynamic characteristics of the valve gear are extremely critical because the hydraulic unit will extend to take up lash in case of misbehavior, holding the valve off its seat. This critical tappet pump-up speed was increased from below 4,000 rpm with the experimental design to over 4500 rpm after the changes were made.

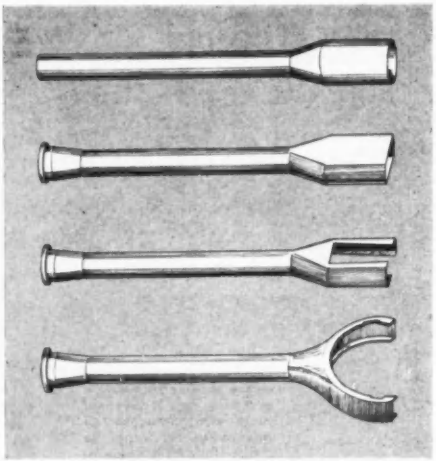
The foregoing article is from the paper, "The New Cadillac Engine," which was presented by the authors at the recent SAE National Passenger Car, Body, and Production Meeting in Detroit.



Longitudinal section of the engine showing such details as the five main bearings, oil pump with Floto-type oil level screen, and part of the Hydra-Matic transmission assembly.

Automation

By Joseph Geschelin



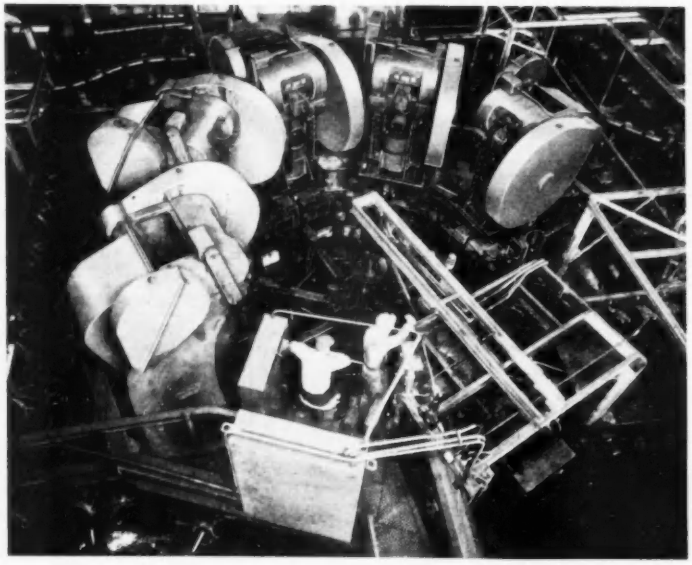
This drawing shows the main stages of development of the rear axle banjo housing half. Reading from top to bottom: the tube after reduction; next, after upsetting and flattening; third, following notching; and the bottom sketch, after processing through the turret press merry-go-round.

ONE of the most unusual plants in the industry for producing rear axle banjo type housings is being operated by the Ford Motor Co. at Mound Road. Harnessing the most advanced techniques and machinery known to the art and utilizing the Ford Automation principle for handling materials, this operation is capable of producing 2000 completely machined rear axle housings in an eight-hour day.

Although it took considerable engineering to develop the present setup, its fruition is a mass production way of making the housing, starting with two $4\frac{1}{2}$ in. diameter SAE 1010 welded steel tubes of relatively light wall, $30\frac{1}{2}$ in. long each. So much depends upon the maintenance of close tolerances at various stages that wall thickness of the purchased tubing is held to tolerance of 0.005 in.

The axle plant abounds in striking examples of automation in the form of automatic transfer arrangements, sometimes of great intricacy depending upon the nature of the job. One of these is at the point of transfer of tubing to the conveyor which transports the work to the reducing operations at the very start of the process.

In this operation, the tubes are loaded into a large hopper from which they drop, one at a time, onto a short flight conveyor. This carries tubes to a transfer station fitted with a radial arm. The latter picks up the tube while in horizontal position and raises it to a vertical position, at the same time loading the tube into an automatic transfer fixture. A monorail conveyor traverses the station at this point and as the fixture on the conveyor enters this station a tube is automatically



Here is an interesting view of the automatic merry-go-round arrangement of presses for forming, restrike, and trimming operations on the banjo halves, prior to welding them together. This is an excellent example of Automation, the work being moved automatically by means of the enormous indexing table which turns in counterclockwise direction, starting with the press at the right in the background.

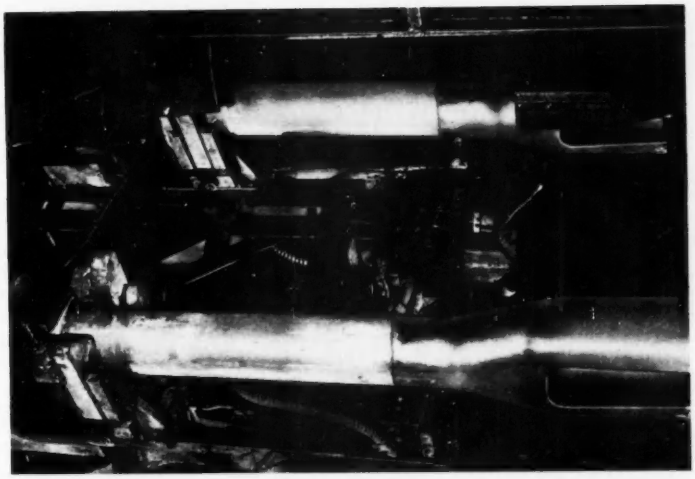
Principle Applied to Production of

Axle Housings

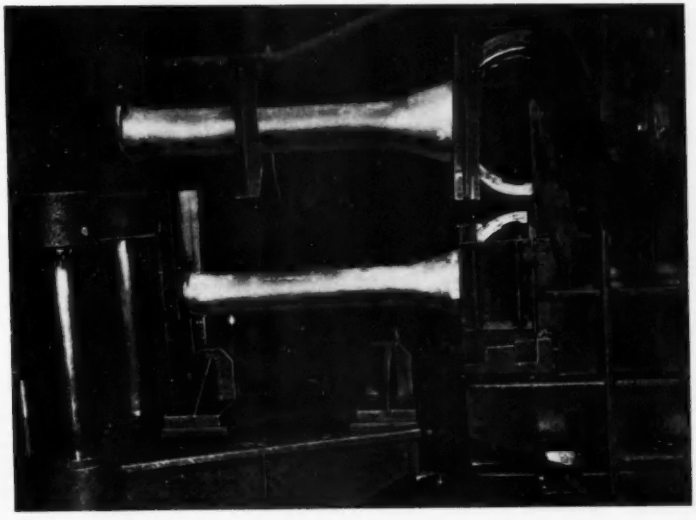
loaded into it in position.

The transfer device is equipped with the necessary electrical interlocks and limit switches to coordinate the speed of the entire system. One of the limit switches, actuated by a slender finger reaching to contact the conveyor fixture, serves to control the loading operation. Normally, the transfer fixture will load a tube into the conveyor fixture as the fixture enters the transfer stage. Occasionally, however, the conveyor fixture may carry a tube which had not been picked off. Whenever this occurs the limit switch shuts off the transfer fixture and prevents an attempt at loading.

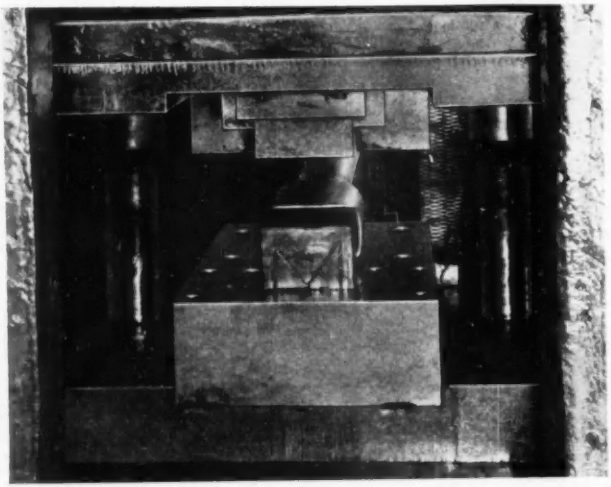
Prior to the initial tube-reducing operations, tubes first go through an alkaline washing machine to remove oil and grease, then are dipped in a tank containing a borax base drawing compound to facilitate the severe reducing operation to follow. This coating is dried by passage through an infra-red tunnel at 210° F. The same procedure is followed in treating the tubes before the press operations on the banjo end as described.



First station on the turret press ring line is an automatic transfer from the monorail feeder conveyor to the station at this point. The tubes are transferred from the conveyor fixture to the turret fixture.



This is the last station of the turret press ring line. At this point the turret ring fixture lines up a completed banjo half and transfers it automatically into a corresponding fixture on the monorail conveyor, moving at the extreme left in this view. The latter conveyor transports the work to the welding machines.



Rear view of the press in which the end of the tube is flattened for banjo formation. The part in the press has just been flattened and is ready for the notching press.

Illustrated here is the transfer station—the last stage of the Automation device described at the beginning of the article. Tubes, as received from the outside, are moved automatically to this point. At the extreme right in the foreground is a radial arm which raises the tubes from horizontal to vertical position. The operator is at the controls of this station. Here the tube is automatically transferred into a fixture on the moving monorail conveyor which may be seen in the background.

The major phases of the operation consist of swagging the tube in two special machines built for the purpose to reduce the diameter except at one end where the banjo formation is made later. The other end of the tube then is upset in National upsetters fitted with multiple-stage dies to produce the flanged end. (See drawing showing these major steps.) Following the second reduction of the tube, work is dropped onto a floor type conveyor and transported to a propane-fired furnace in which the conveyor causes the tubes to roll along horizontal rails to assure even heating. Only the severely reduced end of the tube is heated here.

Following swaging, the formed tubes are first flattened at the banjo end, then notched in preparation for forming the banjo half section. One of the major problems, on which the process hinged, was the development of the dies and procedure for notching. Extremely close tolerances—for press work—are required in making the die. The dimensions of the notched opening, maintenance of alignment of the notch with respect to the axis of the end, and the dimensions and location of the corner radii must be held closely to prevent tearing in subsequent operations.

Heat treatment is applied to the work after the flattening and notching operations so as to provide adequate stress relief. Here it goes through a propane-fired furnace, 30 ft long, where the temperature is maintained at 1400° F.

It is of interest that progressive changes and improvements have been made in various phases of the set-up since initial production was begun. Only recently, the steps in forming the banjo have been reduced in number from the original five-press arrangement to a four-press set-up. At the same time the group of presses has been organized into an automatic cycle which requires no operator supervision whatever, except for one man at a control panel. His job, primarily, is to coordinate the speed of feeder conveyors with changes in schedule, and to stop operations in the event of trouble or breakdown.

This arrangement has been singled out for special treatment because it represents the latest extension of the principle of Automation pioneered

(*Turn to page* **64**, *please*)

No Spring Rally in Used Car Prices

THE prices which used car dealers are asking for postwar models have declined rather steadily for the last twelve months. This spring there was no spring rally in used car prices like the upswing which ran from March, 1947, to August, 1947, and the shorter lived rally from March, 1948, to early July, 1948.

In previous spring periods, prices have increased almost $200 per car as the summer selling season approached. The failure of any rally to develop in 1949 to date indicates a more competitive price situation.

In spite of the continued decline in used car prices, the passenger car market still seems to be in better shape than it was in prosperous prewar years. As indicated from the chart, *on the average* used car dealers are asking something more than the recommended price for 1949 models of the Big Three.

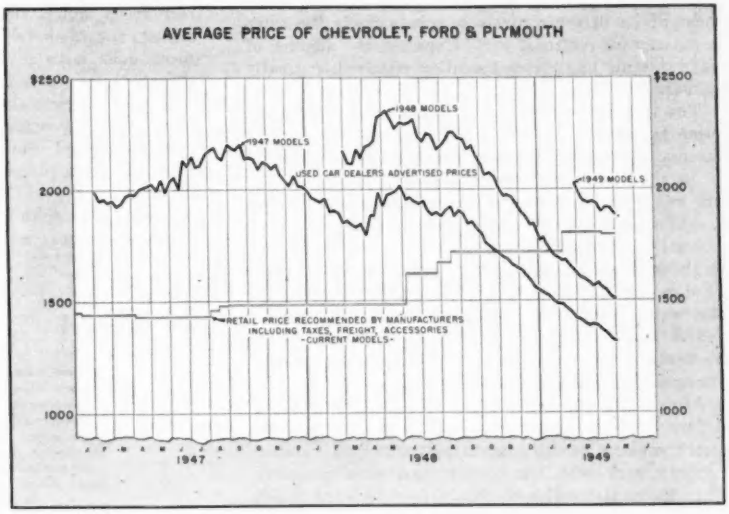
The Chevrolet still brings quite a substantial premium, while the used car dealer is asking, on the average, a nominal premium on the Plymouth, and the Ford, which has been out for ten months, is offered by used car lots for something a little bit less than the manufacturer's recommended price. In considering data of this character, it is necessary to remember that these are based on offerings for given year models, without regard to condition. It is quite obvious that the average 1949 Ford now being offered for resale has a good many more miles on it than the Plymouth or Chevrolet of the same year model.

It is remarkable, however, by any normal standards, to consider the fact that some makes of cars are still enjoying such vigorous demand that used car dealers are able to ask some premium over the price at which new car dealers sell these makes. Even in the best prewar markets, when the industry was running at substantial capacity, like 1929, 1937 and 1941, no such resale premium existed. That is, used car lots offered every make of car at, or somewhat below, the recommended price of the new car dealer.

The continuation of this premium for certain makes indicates that the passenger car market is still unusually firm by any prewar standard.

Among the independents, Studebaker, which has, throughout the postwar period, continued to command the best price on the used car lot relative to new car prices of any independent, has shown remarkable strength to date. On the average, it appears that used car dealers are asking the full recommended retail price for almost new Studebakers, as contrasted with some prices of as much as 25 per cent off in the case of some other makes of cars.

This continued strength of demand for Studebaker, particularly in the face of impending new body styles sometime later this year, suggests that the free market puts quite high appreciation on the advanced styling that has characterized this particular car in the postwar period.



Automatic Transmissions

Chrysler *Newest M-6 Hydraulically Operated . . . .*

CHRYSLER CORP. offers a transmission on its Chrysler, DeSoto, and Dodge cars in which intermediate gear changes are effected by hydraulic power which is controlled by car speed. Designated the M-6 hydraulically operated transmission, it is automatic in that it automatically downshifts when the car is slowed down to a predetermined speed, and automatically upshifts when the car is accelerated above a predetermined speed and the accelerator is momentarily released. These shifts occur in either of the two manually selected forward speed ranges.

The principal objective in the M-6 transmission design is the same as that of other transmissions dealt with in these articles; namely, to reduce physical effort on the part of the driver. Chrysler Corp. cars equipped with this transmission have a manual gearshift lever and a clutch pedal, and the general arrangement of its driver controls is substantially the same as on any conventional car. However, the amount of gear shifting and clutch operation required is greatly reduced.

The Chrysler Corp. M-6 is a four-speed, constant-mesh transmission. The shift lever on the steering column has only two forward speed positions, referred to as the low range and high range positions. The low range covers first and second speeds. Third and fourth speeds are obtained in the high range. Under normal operating conditions, nearly all driving is done in the high range. This means that most driving can be done without manual shifting and declutching for the car is started in third speed and the shift to fourth speed is made by the hydraulic unit with a momentary release of the accelerator after the proper car speed has been attained.

Aside from its control features, the transmission differs from the conventional in that an overrunning clutch engages or disengages the countershaft underrunning gear with the countershaft gear assembly. This makes it possible to obtain four forward speeds with the same number of gears ordinarily required for three speeds and thus materially shortens the transmission case, makes for stiffer shafts, and results in greater quietness of operation. All of the gears have helical teeth. Both a fluid coupling and a friction clutch are used with this transmission, the clutch being interposed between the fluid coupling and the transmission.

On the main shaft axis of the transmission (see Fig. 1) there are two sliding clutch sleeves. The direct speed clutch sleeve, which is hydraulically operated, functions to engage or disengage the third speed gear with respect to the drive pinion. The manual clutch sleeve is operated by means of the shift lever and connects either the third speed gear or the first speed gear with the main shaft.

In first speed, the third speed gear is disengaged from the drive pinion and the manual shift engages the first speed gear with the main shaft. Therefore, the drive is through the forward pair of gears to the countershaft gear assembly and from there through

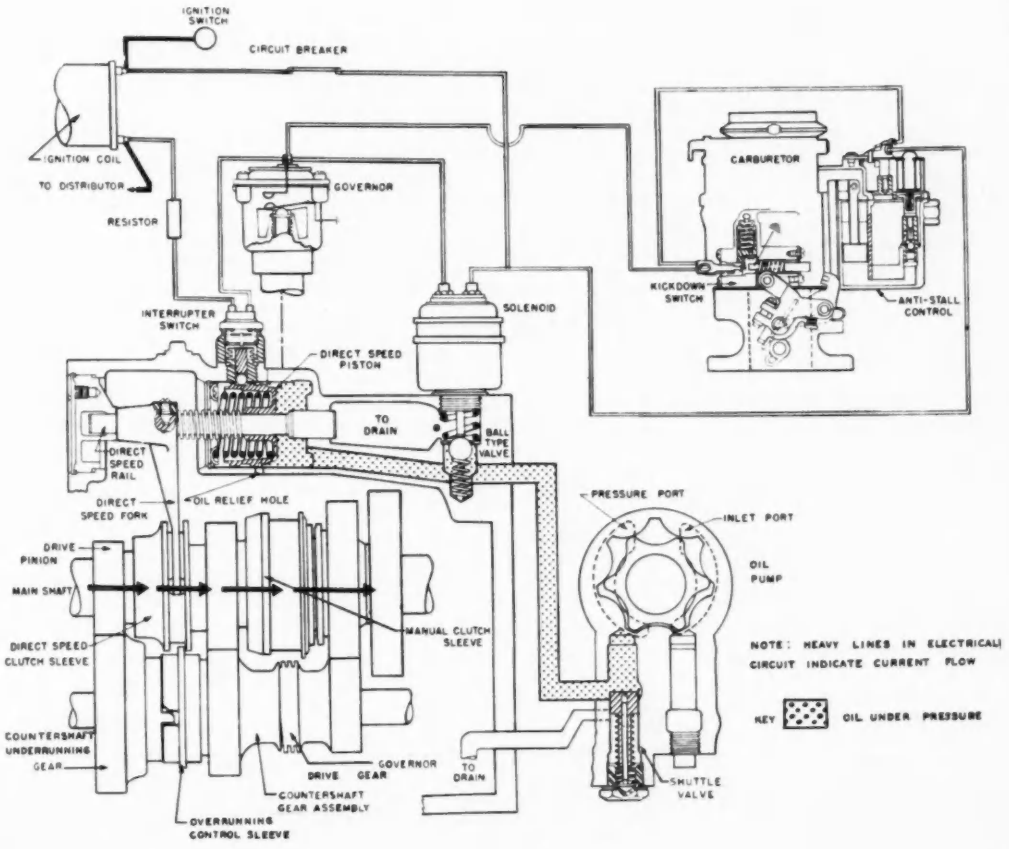
Fig. 1 →

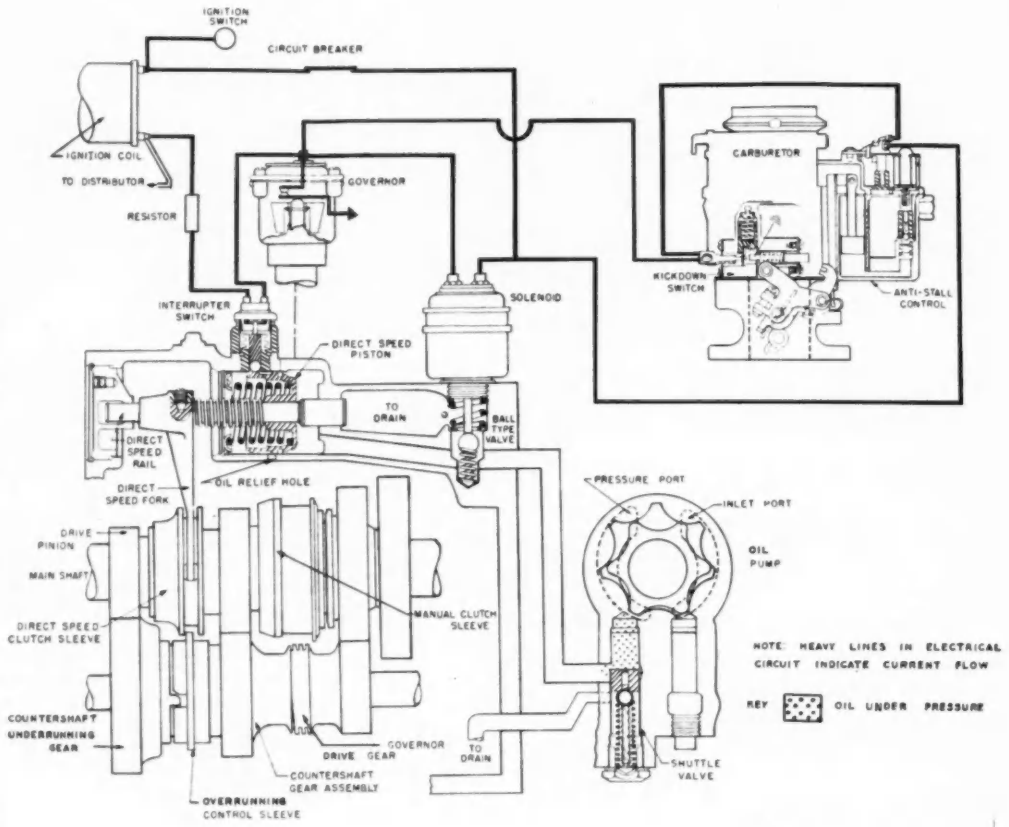
Schematic diagram showing electrical circuit and position of parts when in fourth speed. (1) Above 12 mph, the governor switch breaks the solenoid circuit. (2) Solenoid is de-energized—ball type valve closes. (3) Oil pressure forces direct speed piston forward. (4) Releasing the accelerator allows drive pinion to synchronize with main shaft, thus permitting the engagement of the direct speed clutch sleeve. (5) Drive continues directly from pinion to main shaft—by-passing all gears.

Part III

This Article is the Third in a Series on Modern Automatic Transmissions, the First of Which Appeared in the April 15, 1949 Issue of AUTOMOTIVE INDUSTRIES. It Describes and Illustrates the Latest Model Hydraulically-Operated Transmission Offered by the Chrysler Corp. on Its Chrysler, DeSoto and Dodge Cars. The Next Article in This Series will Appear in an Early Issue of AUTOMOTIVE INDUSTRIES.

By P. M. Heldt





the rear pair of gears to the main shaft. Because the third speed gear is disengaged from the drive pinion, it is idling, being turned by the intermediate countershaft gear.

To secure second speed, the direct speed clutch sleeve is moved forward by the hydraulic controls and engages the third speed gear to the pinion. Because the countershaft underrunning gear is now turning slower than the intermediate countershaft gear, the countershaft underrunning gear is disengaged by the overrunning clutch from the countershaft gear assembly. As a safety measure, the overrunning control sleeve is carried forward by the direct speed clutch sleeve and provides a cam action on the overrunning clutch roller cage to prevent engagement of the countershaft underrunning gear with the countershaft gear assembly until the direct speed clutch sleeve is disengaged. As the first speed gear is still engaged with the main shaft, the drive is now through the intermediate gears to the countershaft gear assembly and from there to the mainshaft through the rear gears. The countershaft underrunning gear is now idling.

For third speed, the third speed gear is disengaged

Fig. 3 →

Schematic diagram of governor and kickdown switch. The kickdown switch initiates the same sequence of operations as closing the governor switch.

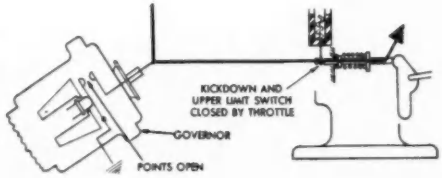


Fig. 2

This diagram shows how downshift occurs through governor control. When the car speed decreases to five mph in low range or 10 mph in high range, the governor switch points will close, and the solenoid will open the ball type valve to relieve oil pressure behind the direct speed piston. The piston return spring will move the piston rearward and disengage the direct speed clutch sleeve.

from the drive pinion as in the first speed drive. However, the third speed gear is now manually clutched to the mainshaft and the drive is, therefore, through the front gears to the countershaft gear assembly and from there through the intermediate gears to the mainshaft. In fourth speed, the hydraulic control operates to engage the third speed gear to the drive pinion and to free the countershaft underrunning gear. Thus, the drive is direct and all gears are idling.

The oil pump is mounted on and driven by the main shaft. It provides oil pressure when the main shaft is rotating and when the solenoid-operated ball-type valve is closed. This oil pressure is used for actuation of the direct speed piston, and engagement of the third speed gear with the drive pinion through the direct speed clutch sleeve is accomplished.

Most driving is done in the high range. When starting from a stop with the gearshift lever in the high range position, the car will start in third speed. At approximately 12 miles per hour, the governor switch opens, thus breaking the circuit through the solenoid. As the solenoid is de-energized, a spring closes the ball type valve which prevents oil from draining. Immediately pressure builds up and the direct speed piston moves forward. The piston motion is communicated to the direct speed fork by means of a spring surrounding the direct speed rail. When the accelerator is released at any speed above 12 miles per hour, the drive pinion slows down and becomes synchronized with the third speed gear allowing the direct speed clutch sleeve to engage the gears, and direct drive results. A blocker is disposed between the drive pinion and third speed gear and operates to prevent clutching of the direct speed clutch sleeve until a synchronous relation has been established by slowing down the drive pinion.

In Fig. 1, the manual clutch sleeve is shown engaged with the third speed gear, which provides the high range. If the sleeve had been engaged with the first speed gear, the car would have started in first speed, the governor points would open at about 6 miles per hour, and hydraulic pressure would provide the shift into second (upon momentary release of the accelerator) by clutching the third speed gear to the main drive pinion.

When downshifting in a car with a conventional transmission, two preliminary operations are necessary; the clutch must be disengaged and the accelerator pedal must be released to relieve the load on the driving member. It is obvious that substantially the same condition of load relief must be provided if the automatic shift is to occur. In the M-6 transmission, this condition is provided for by an ignition interrupter switch. Mounted on the transmission case (Fig. 2), the interrupter switch is operated by a ramp on the direct speed piston. When the car speed drops below approximately 10 miles per hour in the high range or 5 miles per hour in the low range, the governor points close and the solenoid is energized. Therefore, the oil pressure is relieved through the open ball type valve. The piston return spring then forces the direct speed piston toward the rear. When the piston moves to the rear, the ramp on the piston momentarily contacts the ball of the interrupter switch and the switch is closed. This provides momentary grounding of the primary ignition circuit and the resulting torque relief allows the return spring to disengage the third speed gear from the drive pinion.

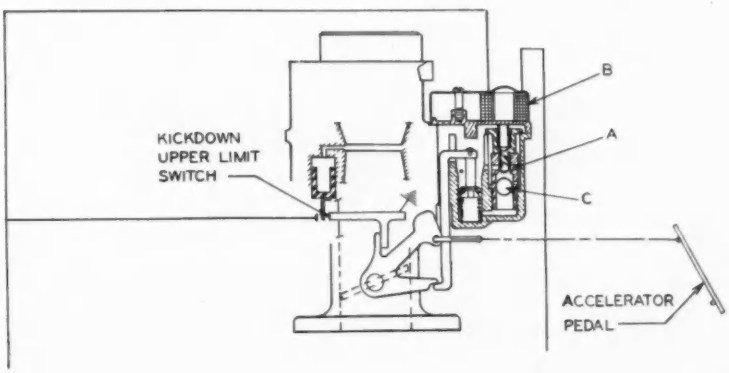


Fig. 4

Cross section of anti-stall control and schematic illustration of kickdown and upper limit switch. Carburetor venturi vacuum raises kickdown switch plunger to prevent kickdown above 45 mph.

At the same time, the overrunning clutch engages the countershaft underrunning gear with the countershaft gear assembly. During an upshift, the ignition is not interrupted, despite the fact that the interrupter switch will close, as the governor switch is open and the ignition grounding circuit is broken.

To make it possible for the driver to effect a downshift while the car is traveling at speeds above the automatic downshift, a kickdown switch is mounted on the carburetor. The driver can close this switch by depressing the accelerator to the limit of its travel. As the kickdown switch is connected in parallel with the governor switch, closing the kickdown switch completes the circuit to the solenoid and the same sequence of operations follows as for the automatic governor downshift. Thus, for automatic downshift the solenoid circuit is closed by the governor switch (Fig. 2) and for driver-controlled downshift the solenoid circuit is closed by the kickdown switch (Fig. 3). This kickdown is effective only for speeds up to approximately 45 miles per hour in fourth speed and approximately 22 miles per hour in second speed. At higher speeds a small piston, controlled by vacuum at the carburetor venturi, moves up and draws an intermediate contact point of the kickdown switch out of position, thereby preventing closing of the switch.

While coasting, an engine braking effect occurs in second or fourth speeds. If a higher engine braking effect is desired while descending steep hills in fourth speed, the transmission may be readily shifted manually to the low range.

To start an engine by pushing the car, the ignition switch is turned on and the gearshift lever placed in the low range with the friction clutch released. When a car speed of about 10-15 miles per hour has been attained, the clutch is engaged and the engine will start in second gear.

It appears that on cars equipped with fluid couplings there is a tendency at low car speeds for the engine to stall when the accelerator is suddenly released. To prevent such stalling, Chrysler Corp. cars with hydraulically operated transmissions are provided with a dashpot on the carburetor which slows down the closing motion of the throttle under this condition. A sectional view of this throttle is shown in Fig. 4. The device consists of a cylinder at the side of the carburetor enclosing a leather seal piston that is connected to an arm on the throttle shaft by means of linkage. When the engine is under load (throttle open) the piston is in its raised position and the space below is filled with gasoline. The throttle can close only as the piston descends and gasoline is forced out. At normal car speeds, the gasoline can escape freely through passage "A" and there is no dashpot action. But when the car speeds drop below 6 miles per hour in low, or 12 miles per hour in high range, the points of the transmission governor will close and this energizes the magnet "B" of the dashpot. The anti-stall control is indicated in Figs. 1 and 2. This magnet raises a small plunger, the ball "C" closes the regular discharge opening "A" and forces the gasoline to escape through a small opening, thereby slowing down the closing motion of the throttle.

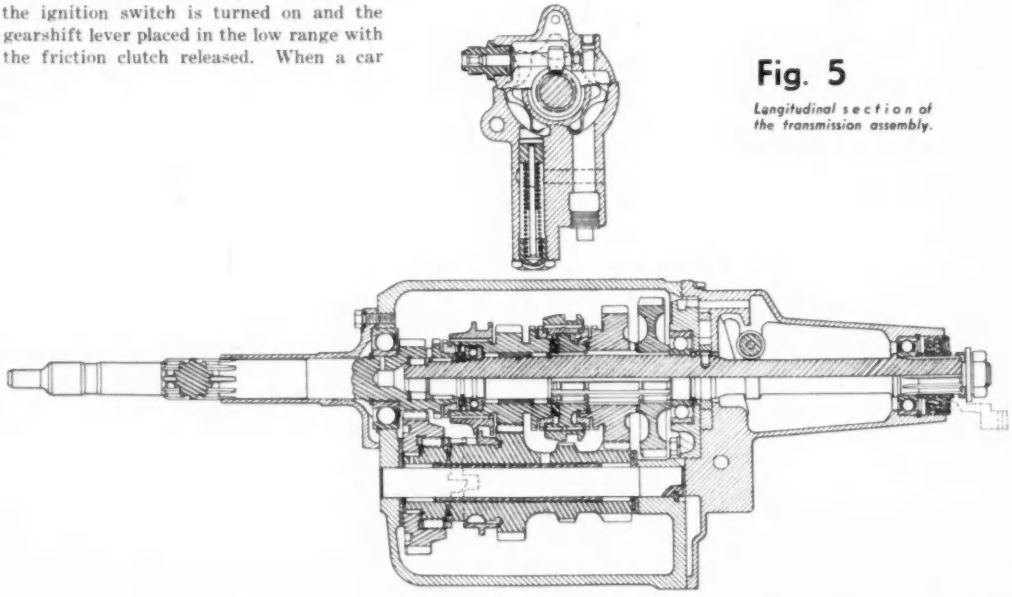


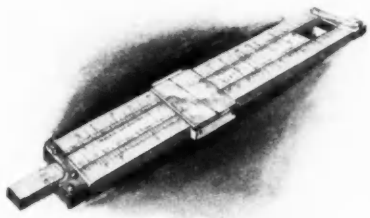
Fig. 5

Longitudinal section of the transmission assembly.

The Position of Chief Engineers in Management

EVIDENCE of the high position in management occupied by chief engineers of automobile companies is contained in a recent study by Arthur Lazarus, vice-president, Day & Zimmermann, Inc., Chicago, Ill., entitled, "The Chief Engineer—His Status and Responsibilities." Of the nine chief engineers polled in the automobile and automobile parts industries, six were officers of the company and three were not, while two were directors, and one was a member of the executive committee. The high relative position of the engineer in the automotive industries is seen in the fact that although the number of chief engineers with official status shows a marked variation among industries, it rises to 60 per cent for aircraft, automobile, and machinery enterprises, and declines to 20 per cent for some heavy industries.

There is no discernible uniformity in the duties of the chief engineering officer of companies in the automobile and automobile parts and accessories industries. Perhaps the single most recurring function is responsibility for product design and development. A chief engineer of one of the wheel companies states he is not only responsible for product design, but likewise for selling the design to customers, and oftentimes to his management. He, therefore, finds it necessary to understand the problems of his company's customers as well as to comprehend the sales and manufacturing problems of his employer.



Coupled with the design function, there is at times a measure of responsibility for manufacturing methods. One chief engineer is expected to design the machinery for manufacturing, several the tooling of the machinery. A chief engineer of a spring company is responsible for proper operational sequences in manufacturing and establishment of standard work hours for each process operation. In his case, he has jurisdiction over the time study department, quality control of materials and product, and over the laboratories (physical, chemical and metallurgical).

As a rule, but not invariably, the chief engineer in the automotive industries appears not to be concerned with plant maintenance. Responsibility for the design and construction of new facilities does not bulk large, but there are instances where this responsibility comes within the province of the chief engineer.

An interesting responsibility, found in one case, is the supervision of all patent work, insofar as it entails contact between the company and its patent attorney. All correspondence relating to patent applications and patent matters passes over the chief engineer's desk.

Inasmuch as automobile companies tend to be large enterprises, the administrative aspect of the chief engineer's job is recurrently stressed, in such phrases as "Have general charge of all engineering," "Co-ordinate all engineering efforts," and, "It should be evident that my responsibility entails the overall administration of all company engineering matters." The last chief engineer in amplification states that it his duty to organize the activities of the engineering division as a whole, to administer managerial policy in the division, to establish all projects and priorities, to make final decisions on the scope of the research programs, to represent the company, and to establish co-operation and friendly relations with all departments with which the engineering department deals.

Were one to examine the duties of the chief engineers in the aircraft manufacturing business, a correspondence would be found with those existing among automobile companies. There would be a comparable emphasis on administration, research, development and design, plus the testing in flight of the end-product, the airplane.

There are several schools of thought with respect to the standing accorded chief engineers by management. One group believes the chief engineer about occupies the position he deserves, based upon the importance of his contribution; that in industries where his performance is vital he seems to have attained a commensurate ranking. There are others who feel and feel deeply that the contribution of the chief engineer to successful operation has been inadequately recognized. Those who hold this view are of the opinion that the future of a company hinges to a con-

(*Turn to page* 64, *please*)

OBSERVATIONS

By JOSEPH GESCHELIN

Chrome Rings

Surely one of the most important postwar developments is the adoption of chromium-plated top rings in passenger car engines; and the wider use of such rings in heavy duty engines. From a scientific standpoint the mechanism of these rings is not completely known. Their advantages, however, include: freedom from corrosion, longer life, and less wear on cylinder walls.

Cast Cranks

Things have been quiet on the crankshaft front for some years, general exploitation of the cast crankshaft having been interrupted by the war. During the war Campbell, Wyant and Cannon operated a specialized foundry, primarily for the Navy, and made an enormous tonnage of cast crankshafts for big engines such as the O-P Fairbanks-Morse Diesel, and for large compressors. Not only were these big crankshafts—some about 20 ft long—entirely satisfactory, but the process was a life-saver at a time when forging capacity was at a premium. Meanwhile, Ford has made some millions of engines equipped with crankshafts and they have done well in the hands of the motoring public. All this leads up to the point that some time soon we expect an intensive drive—supported by a new research program—to expand the use of cast crankshafts in passenger car and heavy duty engines.

Machinery Buying

The automotive industries have been recognized for years as the largest single industrial buyer of machine tools. At one time it was credited with the ownership of at least 42 per cent of all machine tools in the USA. Since the end of the war our industry has established another remarkable record. It is the most important buyer of special high production machine tools. Moreover, while many other industries are buying equipment to replace worn-out machinery, this industry is acquiring machine tools by the plant-load for entirely new product programs. More important still is the fact that machine tool buying for new programs is a continuing process—not just a postwar splurge.

Preventive Inspection

Magnaflux Corporation has pointed out an important and widespread trend in quality control. In conventional practice, final inspection is relied upon to assure conformity to specifications of component parts. However, many parts that start as forgings or castings may have defects invisible to the naked eye while they are in the rough state. When such defects become uncovered in machining the total economic loss includes not only the cost of raw material but the cost of machining and waste of productive time as well. Quite a number of motor car producers have installed Magnaflux inspection for initial acceptance of forgings and castings before machining. It's an uncommon practice, but it pays off.

Film Report

An unusual film revealing the mechanics of the generation of metallic bearing surfaces by various methods of metal removal has been made by the Micromatic Hone Corp. By ultra-high-speed photography and by the use of plastic models, Micromatic shows the mechanism of metal cutting and the generation of skin and penetrant stresses as revealed by photoelastic studies. The techniques employed in making this film should be of interest to production men and research specialists alike.

Ultra Sonic

Under development at Magnaflux is a brilliant new technique for measuring the actual thickness of usually inaccessible areas such as cylinder walls, or as a one-side precision micrometer for measuring the thickness of sheet steel with a single contact. Similarly the wall thickness of a tube can be measured from the outside. These operations and many others are performed with the Sonizon instrument, an adaptation of ultrasonic measurement.

Engine Progress

Whether 1950 models will feature more new engines is a moot question. Even among GM divisions there is little indication that the lead of Cadillac and Oldsmobile will be followed immediatey. Apparently most motor car producers are inclined to go slow, pending closer proximity to fuels of super octane ratings.

Looking Back

Sixteen years ago Reo introduced the forerunner of semi-automatic transmissions as standard equipment on Reo Royale models and at $85 extra on Reo Flying Clouds. As described in AUTOMOTIVE INDUSTRIES, April 29, 1933, this was a four-speed unit in conjunction with a conventional Long clutch. High and low ranges were selected by the driver, using the mechanical clutch in the usual way. However, the shift from third to fourth—in the high range—or first to second— in the low range was made automatically by governor control. Here is a bit of history to paste in your file on automatic drives.

Depreciation Allowance

The machine tool industry is currently fighting a battle in Washington for more realistic depreciation policy for capital equipment. The impact of high labor rates, the need for lower costs, and the prodding of competition make it necessary to amortize machine tools quickly. If and when higher depreciation rates are allowed by the government, manufacturers will be in better position to make replacements out of reserves. Moreover, if and when higher rates are allowed, manufacturers can justifiably build up reserves from funds now considered profits.

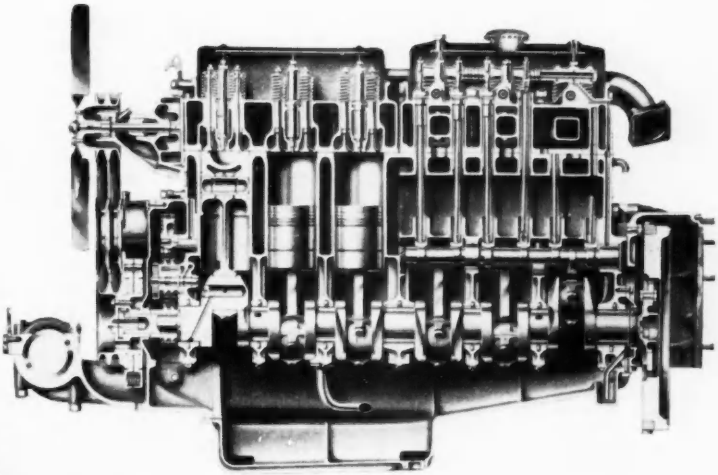
Define Width

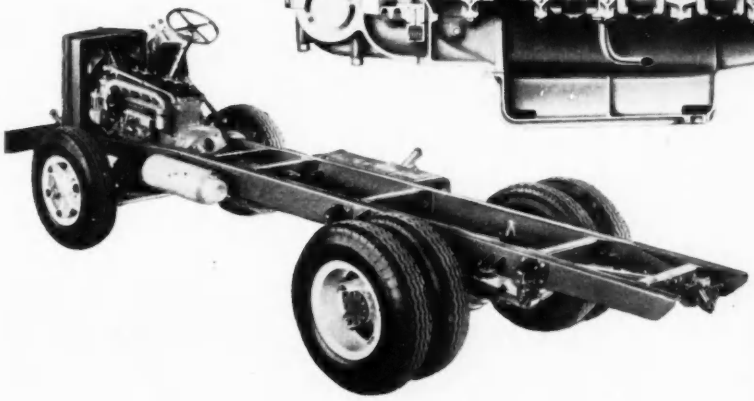
Body width is no longer an index of seating capacity. Some of the current narrow cars have as much rear seat room as do the widest on the road. Many engineers insist that seat measurements—if they are to mean anything—must give dimensions in terms of both hip room and shoulder room. Apparently the conventional AMA method of specifying seat width along a line five inches from the seat back intersection has served its purpose and should be revised. As a matter of fact, General Motors has recommended to its divisions that they specify both hip room and shoulder room; and several 1949 diagrams—Cadillac and Chevrolet being good examples—show these figures. It is plain that with some forms of body contour ample hip room for three may not mean comfortable seating if shoulder room is cramped. In any event, if one really wishes to compare seating comfort of various makes, shoulder room is a major criterion.

Fiat Diesel-Powered

Heavy Duty Trucks

(Right) Cutaway view of the 640 N Diesel engine.





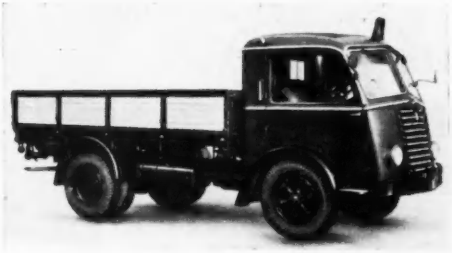
The 680 N chassis has eight forward speeds and two reverse speeds. Its double reduction rear axle is full floating type with a welded steel housing.

A NEW line of heavy duty trucks was recently introduced by Fiat of Turin, Italy. They are powered by Fiat Diesel engines and are offered in three models; the 680 N, the 670 N, and the 640 N.

The Model 680 N has a capacity up to 7¾ tons and, in addition, can haul a trailer carrying 12 tons. Its six-cylinder engine has a bore and stroke of 4.8 in. by 5.71 in., a piston displacement of 620 cu in., and develops 123 hp at 1800 rpm.

The 670 N is not designed for use with a trailer, but can carry loads of seven tons up to 35 mph.

A trailer carrying 4¾ tons may be used with the Model 640 N to bring the total carrying capacity of the combination to nine tons. Powered by a 368 cu in., 72 hp Diesel engine, its top speed is about 40 mph.



This 640 N Fiat truck has a capacity of 4¼ tons without a trailer.

New Machines for

IN celebration of its 20th year as a producer of honing equipment, Micromatic Hone Corp., Detroit, Mich., held open house recently and revealed some of its new developments designed for the mass production automotive industries. This equipment is capable of holding tolerances measured in millionths of an inch, with geometric perfection, and to practically any degree of surface finish.

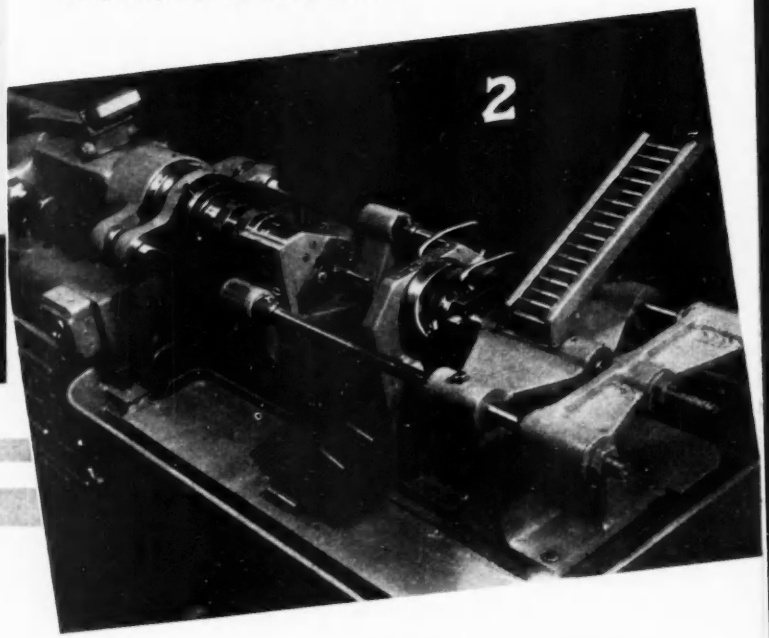
Among the new machines are the following, illustrated here. First is the Model 735 Hydrohoner, for small diameter precision parts, featuring simplicity and ease of operation, and sensitive controls. Parts such as Diesel injector barrels are honed to a tolerance of millionths of an inch, thus reducing time and number of operations, and eliminating selective fits. Shown in Fig. 1, is a set-up for honing a barrel having a hardness of Rockwell 45$_c$. Size is held to 0.0001 in. on the diameter while geometrical accuracy is held to 0.000025 in. Surface finish is 2 to 4 microinch (rms).

An innovation in valve guide production is the Model 523 Hydrohoner, Fig. 2, a quill type horizontal machine for honing guides at the rate of 250 an hour. Size is held within 0.0003 in. on the diameter, the bore being held straight and round.

The operation is entirely automatic, the guides being loaded into a

Fig. 1—This is the Model 735 Hydrohoner suitable for honing small precision parts such as Diesel injector barrels.

Fig. 2—Quill type horizontal Hydrohoner arranged for honing valve guides at the rate of 250 an hour.



Automotive Production

magazine. As each part is finished, it is ejected as the next part is loaded automatically into the collet fixture. The quill then moves forward and another part drops into the loading position. At the forward end of the first stroke, the tool starts rotating and the Microdial control expands the tool. When the bore is to size, the Microsize control ends the cycle by collapsing the tool and withdrawing it from the bore.

To assure an adequate supply of coolant the machine is equipped with the new Intra-Flo tool. The coolant flows through the inside of the tool and is jetted directly on the surface during the honing operation.

Fig. 3 is an adaption of a Barnesdril honing machine with a Micromatic gage bar and Microsize head, and tool for honing

(*Turn to page* 64, *please*)

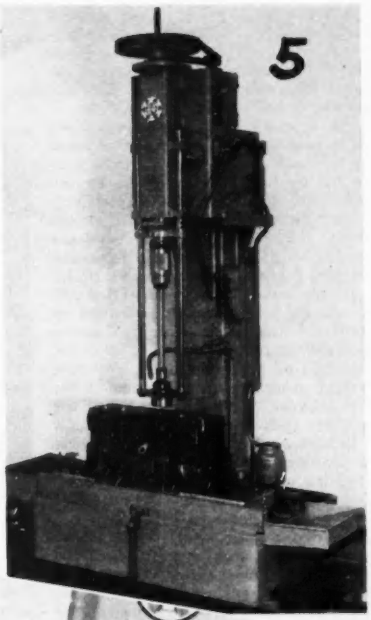
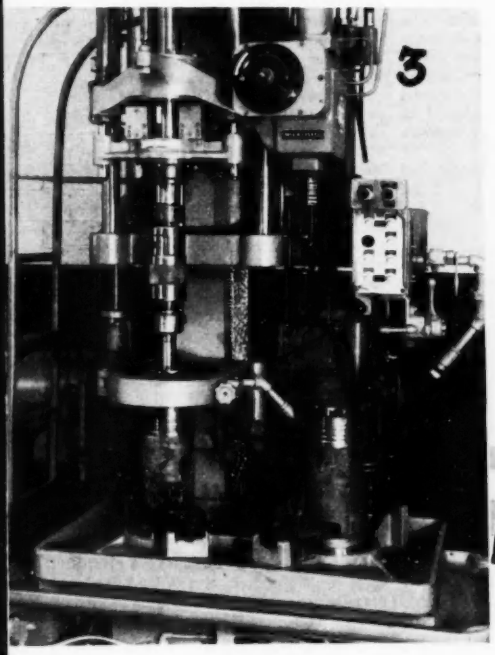


Fig. 3—Large Diesel cylinder liners can be honed to amazingly fine tolerances on this Barnesdril machine fitted with Micromatic gage bar and Microsize head and tool.

Fig. 4—Productivity of the familiar two-spindle Hydrohoner has been greatly increased by the provision of magazine feed and automatic loading and unloading.

Fig. 5—Latest model in the line is this general purpose honing machine designed for tool rooms and reconditioning shops and capable of honing a variety of different parts.



NEW

Production and Plant

EQUIPMENT

For additional information please use coupon on page 54

B-109—Stock Feed Accessory

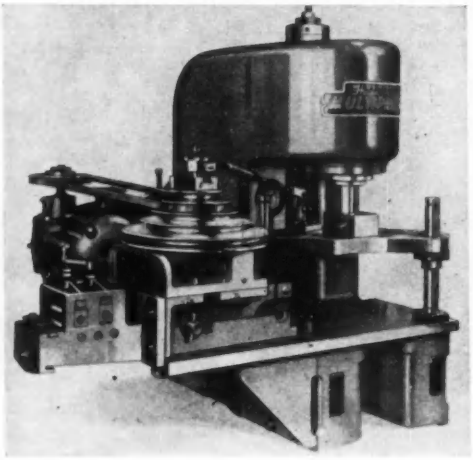
With the new harmonic stock feed accessory announced by the Denison Engineering Co. of Columbus, Ohio, a production rate of as many as 50,000 pieces per hr is claimed possible on the oil-hydraulic Multipress, by automatic feeding of strip stock to punching dies. Available in several models, the accessory provides wide, stepless variations in speed and feed characteristics. Up to approximately 838 cycles per minute are possible with the high-speed unit, and as few as 66 cycles per minute at low speeds.

An accuracy of plus or minus 0.002 in. is said to be maintained. Coil stock up to 3 in. wide and 3/64 in. thick may be fed up to 3 in. per stroke by the accessory. Feeding motion is positively synchronized with the motion of the press ram. Rotation, or harmonic movement, of the valve control crank on the accessory's multi-speed pulley assembly causes the linkage fastened to the guided platen to be raised or lowered. The linkage, in turn, moves the ram control valve spool up or down, directing oil from the press hydraulic system to either top or bottom of the ram cylinder. This raises or lowers the ram for each punching or work cycle.

Relatively short (adjustable) strokes of the Multipress ram deliver preset pressure upon contact with the work. Tonnage preset before the operation is started is applied with identical pressure for each successive stroke as the accessory feeds the strip under the press ram. A long, time-consuming ram stroke is unnecessary. The adjustable stroke length permits use of the shortest cycling time possible for every job. The stroke is not fixed. Immediate pressure build-up, when the press ram contacts the work, avoids damaging impact.

The accessory feed may be manually turned to locate the dies in order to eliminate slow set-up periods. Stroke length of the press ram is adjustable from ⅛ in. to 2½ in., which is the permissible stroke in conjunction with the feeding accessory. The total stroke available within down and up limits of the press permits adjustment to any height necessary for installing the dies.

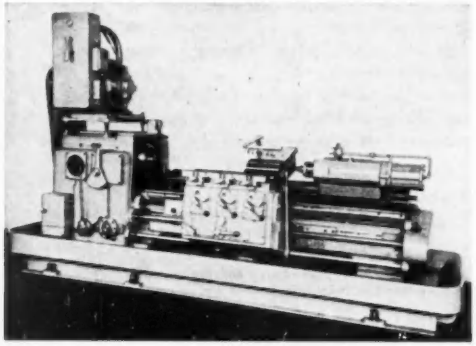
In event of a pile-up of material at the die, it is said that no major damage occurs to either the press or dies. The strip stock is held firmly by an adjustable holding mechanism that permits it to be fed forward only. An automatic stock release may be engaged for piloted punches. Straightening rolls are optional.



Denison harmonic stock feed accessory

B-110—High Speed Lathe

Now in production at Seneca Falls Machine Co., Seneca Falls, N. Y., is their newest Lo-swing lathe, model AP, designed for modern, high-speed multiple turning. The manufacturer recommends this lathe for shaft work involving long shoulder lengths where overlapping of cuts is not desirable, and for short-run jobs where quantities do not justify setup time on fully automatic, closed-cycle machines.



Seneca Falls Lo-swing lathe, model AP

The multiple slide front turning carriage on this semi-automatic lathe operates on the rack and pinion feed principle, permitting longer cuts than possible with cam-operated closed cycle lathes. Heavy stock removal with modern sintered carbide tools is possible because the balanced twin rack pinions mesh with the heat treated steel rack, cutting unit tooth pressures in half.

Carriage cross slides are power operated and individually controlled; hinged-type roller steady rests prevent work from springing away from the tools. An automatic feed throwout is coupled with automatic tool relief. The machine provides rapid traverse movements for longitudinal carriage feed and cross slides, and for the automatic back attachment. There is a manually-operated safety feed clutch which stops all carriage feeds in case of tool breakage. Hardened steel strips are provided on the bed for the carriage and on the top of the carriage for the cross slide ways. The headstock spindle, mounted on heavy-duty ball bearings, is heat-treated. Pulley shaft is equipped with multiple disk clutch and brake, permitting continuous rotation of the electric motor and instant stopping of the headstock spindle.

INLAND STEEL

"'Tain't fair—he's standing on slip-resistant 4-WAY Safety Plate!"

DESIGNED TO PROVIDE SAFETY UNDERFOOT

In this contest—and in the fight against accidents—the worker with Inland 4-WAY Safety Plate underfoot has a definite advantage. 4-WAY protects by gripping firmly . . . thereby helping to stop costly slips, falls, and lost man hours. Install it wherever feet or wheels must go—in your plant or on your product.

INLAND STEEL CO., 38 S. Dearborn St., Chicago 3, Ill. Sales Offices: Chicago, Davenport, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul.

Stocked by Leading Steel Warehouses

Write for Booklet

Inland 4-WAY SAFETY PLATE

Reg. U. S. Pat. Off.

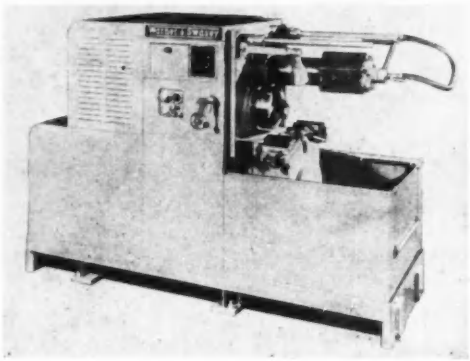
B-111—Automatic Chucking Machine

First 1-AC single-spindle automatic chucking machine produced by the Warner & Swasey Co., Cleveland, Ohio, and put into service, provides front and rear cross slides and a five-faced overhead turret, handling work up to 8½ in. in dia and up to 6 in. in turned length.

Trip-blocks are set in slots on a pentagonal drum at the rear of the turret shaft to control feeds, spindle speeds, length of cutting stroke and skip indexing. Either or both cross slides can be selected to operate with any or all turret faces, and a quick Allen wrench adjustment controls late and dwell

NEW
Production and Plant
EQUIPMENT

For additional information please use coupon on page 54



Warner & Swasey 1-AC single spindle automatic chucking machine.

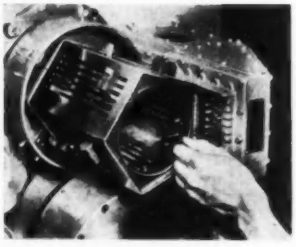
cross slide operation. Cam changes are thus done away with and setup is speedy and simple.

For maximum rigidity, the bearing surfaces on the turret shaft are limited to two, generously dimensioned and enclosed. By virtue of the overhead turret, customary tool overhang on larger dia work is eliminated. Instead, as work diameters increase, tools are brought closer to the guiding ways. Chips drop directly into a large pan below the spindle and may be removed while the machine is in operation.

Set-up controls include feed and speed selectors, automatic and hand operation switches, and "forward," "reverse" and "index" push buttons. Operating controls include spindle and coolant control switches, and "cycle start," "motor start" and "stop" push buttons.

Spindle speed range is from 56 to 1498 rpm. Eight speeds are available from any change gear set-up, as a result of four automatic changes and a high-low shift lever.

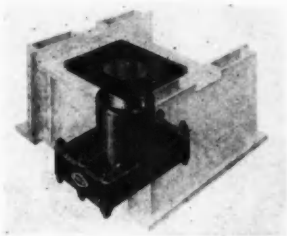
Eighteen feeds are available, from 0.002 in. to 0.083 in. Three are automatically available during operation for each gear set-up. All change gears slide on splined shafts. The machine cannot be started without gear box covers in place. Rapid traverse and the indexing brake permit fast approach strokes without danger to tooling.



Small trips are simply set in this control drum on the Warner & Swasey 1-AC single spindle automatic chucking machine for selection of feeds, spindle speeds, length of cutting stroke and skip indexing

B-112—Power Press Die Cushions

Pneumatic and hydropneumatic die cushions for all type power presses have been added to the line of machinery manufactured by Baker Brothers, Inc., Toledo, Ohio. The new pneumatic cushions are offered in standard sizes from 4 in. through 28 in. dia in the single piston type, and from 10 in. through 30 in. dia in the double piston type. Size and number of cushions depends on individual bed construction and pressure requirements. The hydro-

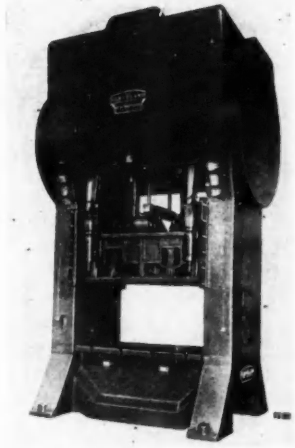


Baker pneumatic and hydropneumatic die cushions

pneumatic cushions, self-contained, can be supplied to fit any press regardless of size or make.

B-113—Double Action Toggle Press

A two point double action toggle press equipped with double geared twin drive and electrically controlled air operated friction clutch, is placed on the market by the Cleveland Punch and Shear Works, Cleveland, Ohio. The press is arranged with air counterbalance to both the inner slide and the



Cleveland two point double action toggle press

blankholder slide, with power adjustment to the inner slide by means of an individual motor. All four corners of the blandholder slide may be individually adjusted manually.

Long dwell of the blankholder—fully 140 deg—enabes the dwell to move back with respect to the slide motion. Because of this the blankholder drops only approximately one in. when the inner slide is at top center. Thereby more clearance is provided between

(*Turn to page 67, please*)

AIRBRIEFS

By ROBERT McLARREN

That Bomber

The nation-wide debate over the Convair B-36 bomber (known as the "Peacemaker") reminds us nostalgically of the same controversy over the Boeing B-9 and Martin B-10 of 1932-33, which "revolutionize aerial warfare" because of their ability to fly at 180 and 200 mph, respectively, thereby "outdistancing the fastest pursuit planes." Whether or not this was literally true depends on how fine you draw the line for the Curtiss P-6E and Boeing P-12F, in service at the time, had top speeds of 197 and 194 mph, respectively! This whole "revolution" in aerial tactics story was repeated in 1935 when the Boeing B-17 Flying Fortress first flew and was billed as the "aerial dreadnought." Again, its speed of 250 mph was to be compared with the 230 mph of the Boeing P-26 fighter then in squadron service. This time the B-36 comparison is made on the basis of altitude, rather than speed, but the inference is the same: "revolution" in the bomber-fighter balance-of-power. Viewed in this perspective it is a little difficult for professional aviation men to become disturbed by this latest battle of words. And so it seems only logical that the highly-publicized B-36—McDonnell F2H "Banshee" duel was vetoed by the Joint Chiefs of Staff because it would serve no useful purpose. The obvious, if calloused, answer, regardless of which type "won" would, of course, be: "So what?" According to the actual performance figures on the two aircraft, all other things being equal, the Banshees should have had little difficulty filming the B-36 in their gun sight aiming point cameras.

Procurement Questioned

It does seem a little odd at this technical transition stage of the game that so much store should be laid by the B-36 procurement-wise. The Air Force has historically pursued a vigorous experimental and development program in peacetime, moving from one aircraft to a superior one rapidly and then on, again, to one even more superior. In the brief postwar years the Air Force has developed a brilliant series of bombers, including jet types, that has rapidly carried bomber speeds right up to that of sound. Assuredly speed is not the controversy. And the magic altitude figure of 40,000 ft is now pretty old stuff to Air Force bombers. All of the jet bombers can operate at this altitude, and with maximum efficiency. The wartime B-29, stripped, could reach 40,000 ft and veteran pilots even insist that the pre-war Boeing YB-17A, lightly loaded, could have reached this altitude. But 40,000 ft is far from the maximum capabilities of modern jet aircraft. There are three fighters and one bomber that can fly steadily at 50,000 ft, so altitude could hardly be the chief claim of the B-36. But on the question of long range the big six-engined monster wins the prize for it alone can fly 10,000 miles with a substantial bomb load. However, most engineers are certain that jet bombers will be able to fly 10,000 miles in the very, very near future. Thus some questions are raised when the Air Force interrupts its extremely productive jet bomber program to pour most of its money into an airplane whose design was laid down April 11, 1941, eight months *before* Pearl Harbor! It is as though eight years of the most fruitful period of aeronautical research and development in aviation history were being quietly laid aside and more and more hundreds of millions of dollars poured into a *pre-war* airplane!

Facing the Facts

There is assuredly no mystery regarding the performance of the B-36, providing all of the facts are not used at one time. The lay press and, to a certain extent, the Air Force itself, have loosely combined the range, speed and ceiling of the B-36 into a single set of flight conditions which is, of course, ridiculous. The airplane can fly 10,000 miles, true, but not at 40,000 ft. It can fly at something over 350 miles per hour, but not for 10,000 miles. Furthermore, it can do none of these things at its maximum takeoff gross weight of well over 300,000 lb necessary for a 10,000-mile flight, which requires somewhere around 160,000 lb of gasoline alone.

Its one great asset—its 10,000-mile range—is substantially reduced by the recent addition of four turbojet engines, which use fuel at just twice the rate of the Pratt & Whitney Wasp Major engines. With a 22 per cent root section the airplane is severely Mach-limited regardless of the addition of jet power. Apparently the layman has again fallen into the familiar trap of comparing oranges and apples. The B-36 is an excellent long-range airplane, the best in that category that we have, but it has already been greatly surpassed in every other department by other aircraft, including Convair's own XB-46, and is ready for supercession. Despite this, still more are being purchased.

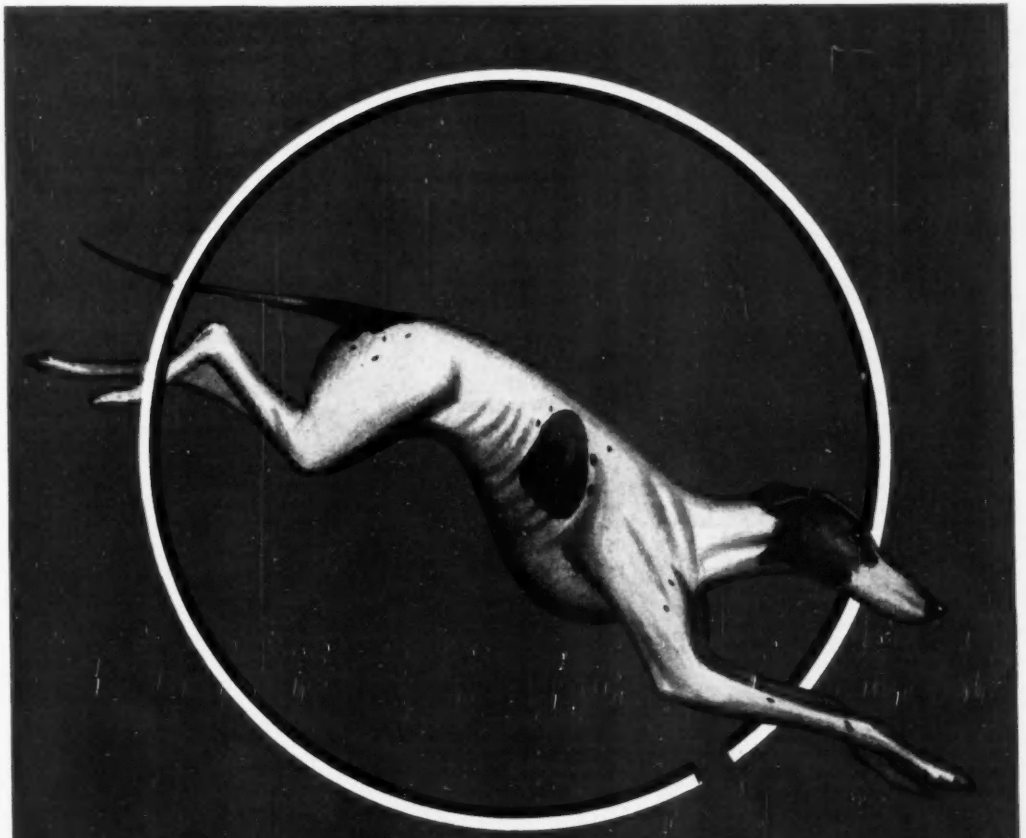
Never Sell the Fighter Short

The Martin B-10 was our "standard" bomber until the Consolidated P-30 came along carrying *two* men at 232 mph and destroyed the myth of "the bomber that can outrun fighters." The Boeing B-17 was "invincible" until the Bell P-39 and the Lockheed P-38 came along to overtake it by a substantial margin. Even if it is granted that the B-36 at more than 40,000 ft is a tough target to overtake from a standing start, there are fighters now in service that are claimed capable of doing it, and there are more fighters, some of them in production, that will be able to "toy" with the B-36 at these altitudes. The fighter development program has lost none of its momentum because of the B-36 procurement. While it is assuredly not a fighter, the Bell X-1 attained supersonic speed nearly two years ago. The Douglas D-558-II is capable of supersonic speed whenever the attempt is made, and the Lockheed XF-90, Republic XF91 and Convair XF-92 are all designed for sonic speed. While none of these is scheduled for procurement immediately—the latter two are virtually research types only—it is obvious that the supersonic fighter is with us right now, if only in the design stage. These airplanes will operate at altitudes in the 60-80,000 ft level, putting an end to any argument regarding a mythical "barrier" at 40,000 ft, although the security barrier at this precise altitude is quite tangible at the moment. While it is painfully true that problems of maneuverability, interception, radar-aids, early warning and physiology remain to be solved, there should be no illusions on the score of pure speed and ceiling with respect to the fighter plane designed to destroy such planes as the B-36. The bomber has not yet held even a slight edge in any single performance category, other than range, over the fighter for longer than a year or two. It wouldn't appear that the B-36 is the plane to deny this historic truth.

Single Weapon Thinking

The sole grounds on which the B-36 is being procured at such enormous expense (already more than $1 billion with the figure scheduled for $2 billion according to present plans) is its ability to deliver an atomic bomb on a vital Russian target and return. Thus, the technical merits of the aircraft are very much secondary factors when

(*Turn to page* 98, *please*)



Quick to leap into any situation

Your changing engine designs create piston ring situations. Meeting such situations is our business. Since 1911 Sealed Power has been eager to co-operate, proud of the results, including the wartime situation when we were able to supply replacement rings to keep your car owners happy. With your help, Sealed Power facilities are now at an all-time high peak of excellence. You are invited to make full use of these facilities to help make your good engines even better.

SEALED POWER CORPORATION
MUSKEGON, MICHIGAN

Sealed Power

PISTON RINGS · PISTONS
CYLINDER SLEEVES

PUBLICATIONS AVAILABLE

Publications listed in this department are obtainable by subscribers through the Editorial Department of AUTOMOTIVE INDUSTRIES. In making requests please be sure to give the NUMBER of the item concerning the publication desired, your name and address, company connection and title.

A-175—Lucite Acrylic Resin

E. I. du Pont de Nemours & Co., Inc.—General information about Lucite acrylic resin cast sheeting is contained in a new 32-page booklet. Contents of the booklet include many pictures and drawings, a chart listing the properties of Lucite cast sheeting, a section devoted to applications and the handling and fabricating of Lucite sheeting. A summary of types, forms and sizes of Lucite sheeting is included, also a detachable inquiry form for use in connection with product problems where du Pont's technical advisory service is desired.

A-176—Safe Driving Booklet

Nash Motors Div., Nash Kelvinator Corp.—The booklet, How to Drive Safely and Economically, written by Cannon Ball Baker, veteran automobile road test driver, is aimed at increased highway and urban driving safety. Complete with passing and stopping speed charts and reproductions of highway markers and driver signals, it features the theme that "safe driving is smart driving—and smart driving is economical in terms of cars and people."

A-177—Diamond Wheels

Raybestos-Manhattan, Inc.—A new 36-page catalog describes the company's line of Resinoid Bonded Diamond Wheels. It contains a complete description of types, sizes, list prices, and other data.

A-178—Strain Gages

The Baldwin Locomotive Works, Testing Equipment Dept.—A new 4-page Baldwin Bulletin No. 279 illustrates the wide variety of uses that have been made of SR-4 bonded resistance wire strain gages. The numerous types of gages that are now available for determining the stresses and strains in structures and parts in service or when subjected to stresses in the laboratory, are also described and illustrated.

A-179—Forging Rods and Shapes

Titan Metal Manufacturing Co.—A new, 2-color folder gives the chemical composition of ten brass and bronze alloys used in Titan forging rods and shapes, as well as the average physical properties of forgings made from them. Typical brass forgings are illustrated in the folder.

A-180—Generator Control Relays

The Hartmann Electrical Mfg. Co.—A 4-page illustrated bulletin gives detailed information on application, construction and operating principle of differential-voltage type relays for aircraft.

A-181—Automatic Recessing Tools

Scully-Jones and Company—Applications, operation, construction and other advantages of modern automatic recessing tools is contained in a new 25-page manual. Comprehensive engineering data is contained in the manual; reliefs for tapping, threading, grinding and honing; retainer ring grooves; oil grooves; chamfers; and second operations on cast or molded parts where molds were simplified by omitting the recess.

A-182—Tru-Fit Tools

Lectrolite Corporation—A new catalog describes the Tru-Fit line of combination pliers, wrenches, tire tools and special automotive tools. It also contains all the latest addition to the company's line now available.

A-183—Welding Notes for Engineers

Eutetic Welding Alloys Corp.—The (*Turn to page* 90, *please*)

TIME SAVER COUPON for your convenience in obtaining, WITHOUT OBLIGATION, more information on any one or more of the publications described above OR New Production and Plant Equipment OR New Products items described on other pages.

Readers' Service Department,
Automotive Industries,
Chestnut & 56th Sts., Philadelphia 39, Pa.

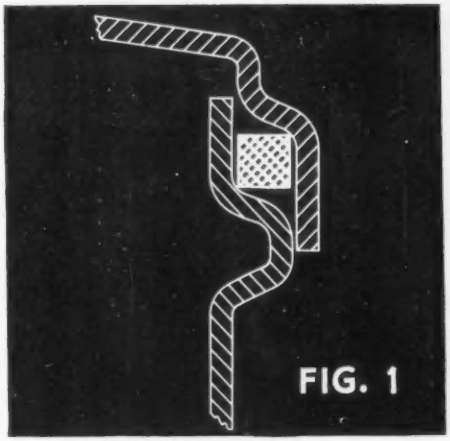
Please send me: **These FREE Publications** (Use letter and designating number of each item desired)	*Please send me more information on:* **New Production and Plant Equipment** (Use letter and designating number of each item desired)	*Please send me more information on:* **New Products** (Use letter and designating number of each item desired)
....	....	....
....	....	....

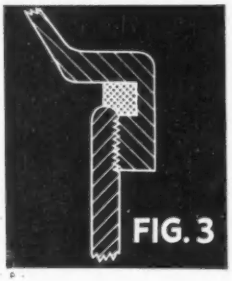
Your Name ..... Your Title .....

Your Company Connection or Business .....

Address ..... (Street & No.) (City) (Zone) (State)

How to cut sealing costs with lathe-cut gaskets





Sealing costs frequently can be reduced through using small section, lathe-cut gaskets. When made of the right sealing material, these gaskets permit the use of smaller machined flanges—or even stamped or spun metal flanges. Thus, by careful selection of gasket materials, the cost-saving features of such design changes can be realized to the fullest extent.

Lathe-cut gaskets, made from one of Armstrong's many cork-and-rubber compositions or straight rubber compounds, will provide an effective, economical seal in most applications of this type.

These square or rectangular section rings are used even when a round or complex section gasket seems to be required. Ordinarily, a cork-and-rubber or rubber gasket will deform sufficiently under pressure and afford an effective, low-cost seal.

For example, the cost of sealing chlorinated oils was reduced by replacing a cast iron flange with the pressed steel construction in figure 1. The lathe-cut gasket made of an Armstrong straight synthetic rubber deforms under pressure to provide a tight seal at lower cost.

The rolled edge flange in figure 2 also replaced a cast iron unit. In this case, an Armstrong's cork-and-rubber lathe-cut gasket was used. Because cork-and-rubber is truly compressible, it conforms to the rolled edge without slipping out of place.

In figure 3, a lathe-cut gasket, made of an Armstrong synthetic rubber compound, replaced an expensive molded part. To facilitate removal of the screw-on cover, the contact area of the gasket was reduced by one half. Yet a tight seal was maintained because the gasket was firmly seated on the round edge.

Armstrong's cork-and-rubber and rubber compounds may help reduce your sealing costs. We recommend that you discuss your application with an Armstrong representative. Methods and materials he suggests may enable you to do a better sealing job at lower cost.

Send for this Gasket Handbook

You'll find useful application and specification data in the new, enlarged 24-page booklet, "Armstrong's Gasket and Sealing Materials." It contains up-to-date data on synthetic rubber, cork-and-synthetic-rubber, cork composition, and fiber sheet sealing materials.

This booklet includes ten technical discussions of the factors influencing modern gasket and joint design. It also suggests methods of putting Armstrong's stock materials to specialized uses in such fields as radio, electrical, automotive, petroleum, and transportation industries. Also included are typical applications and current government specifications.

For your free copy, fill in coupon at right and mail today.

ARMSTRONG CORK CO.
Gaskets and Packings Dept.
1506 Arch Street, Lancaster, Pa.

Please send me at once a copy of the new 24-page booklet, "Armstrong's Gasket and Sealing Materials."

NAME.....
COMPANY.....
ADDRESS.....
CITY.....STATE.....

ARMSTRONG'S
GASKETS • PACKINGS • SEALS

PERSONALS

Recent Personnel Changes and Appointments at the Plants of the Automotive and Aviation Manufacturers and Their Suppliers.

Ford Motor Co.—The appointment of **W. H. Farmer** as truck and fleet sales promotion manager has been announced.

Ford International, Inc.—**David John Conway** has been made tractor and farm equipment manager. **Arthur J. Wieland** is Vice-President and General Manager and **Robert E. Busey** is Chief Engineer.

General Electric Co.—**J. H. Goss** has been appointed Manager of Engineering in the Control Divisions; **J. W. Belanger** and **N. M. Duchemin** have been appointed Asst. General Managers of the Apparatus Dept., and **C. W. LaPierre** has been made Asst. Manager of the Aircraft Gas Turbine Division at Lynn, Mass.

GMC Truck & Coach Div., General Motors Corp.—**R. C. Woodhouse**, formerly Manager for the Southwest, has been promoted to the position of Asst. General Sales Manager of the Truck Division.

Klem Chemicals, Inc.—The appointment of **J. M. O'Brien** as Assistant Sales Manager, has been announced.

The Lombard Corp.—**Grover J. Meyer** has been named President and Director of the company.

Hapman Conveyors, Inc. — **Peter P. Ruppe** has been appointed General Manager.

Mack Trucks, Inc.—The appointment of **J. W. Adelung**, as Manager of Mack-International Motor Truck Corp.'s Brooklyn Branch and **W. A. Brady** as Manager of White Plains Branch, have been announced.

Signode Steel Strapping Co.—**John H. Leslie** has been elected President of the company. **J. W. Leslie** is Chairman of the Board.

Pittsburgh Plate Glass Co.—**Howard J. Mather** has been made Asst. General Manager of industrial finishes for the paint division.

Hyatt Bearings Div., General Motors Corp. — Two Asst. Purchasing Agents have been appointed—**George A. Burgermaster** and **C. Russell Todd.**

Globe-Union, Inc.—**C. O. Wanvig** has been elected Chairman of the Board and **Wyeth Allen** has been elected President.

Firestone International Corp.—**J. N. Vaughan**, formerly operating manager of the Firestone International Company, has been appointed manager of Firestone export trade.

The Firestone Tire & Rubber Co.—**Raymond C. Firestone**, Vice-President, will be in charge of Research and Development.

Hudson Motor Car Co. — **Andrew Hook** was elected secretary of the company. He succeeds **C. D. Sterling**, who has resigned. **W. J. Reuscher** was elected comptroller and **J. H. Clarke**, Assistant Secretary.

Willys-Overland Export Corp. — **Marcel F. DeMuller** has been named President of both the Willys-Overland Export Corp. and Willys-Overland of Canada, Ltd.

Waukesha Motor Co.—The appointment of **Fred C. Schulze** as Sales Manager, has been announced.

Philco Corp. — **Leslie J. Woods** has been made Vice-President-Director of Research and Engineering.

Worthington Pump and Machinery Corp.—At a meeting of the Board of Directors **Robert F. Marshall** was elected Secretary, succeeding the late **C. Neal Barney.**

Perfect Circle Corp.—**C. Dewey Bookout**, industrial engineer for the company, has been named Manufacturing Div. Manager.

Oldmobile Div., General Motors Corp. —**L. A. Kintigh** has been named Asst. Chief Engineer in charge of chassis, body and standards engineering. **D. C. Perkins** has been promoted to experimental engineer succeeding Mr. Kintigh. **T. W. Loring** has been named styling engineer and **Stanford Landell** has been promoted to body engineer.

Dana Corp.—The promotion of **R. B. Haynes** to the position of Director of Manufacturing for all Division of the company, has been announced. **John H. Jones** has been advanced to the post of Plant Manager of the Toledo plant of the Spicer Manufacturing Div.

Star Headlight & Lantern Co. — **Berwin W. Jacobs** has been elected President and Treasurer and **Dolores W. Jacobs** has been named Vice-President and Secretary.

Stewart-Warner Corp. — **George L. Meyer, Jr.**, a Vice-President of the corporation, has been elected to the board of directors. Mr. Meyer's election fills the vacancy created by the death of **Ralph M. Shaw.**

Kaiser-Frazer Corp. — The appointment of **John L. Hallett** as General Manager of the corporation has been announced. **John H. Tacke** was appointed works manager, succeeding Mr. Hallett. The appointment of **Michael Miller** as vice-president and executive assistant to the president, has also been announced.

General Motors Corp.—**Dr. Max R. Burnell** has been appointed medical consultant. Dr. Burnell, medical director of the AC Spark Plug Division of GM, succeeds **Dr. Clarence D. Selby**, who is retiring. Announcement was made of the appointment of **George Russell** as Finance Manager of the General Motors Overseas Operations Div. **Howard W. Megee** has been appointed assistant treasurer of the corporation to succeed Mr. Russell.

American Brake Shoe Co.—**Curtis C. Gary** has been appointed Asst. to the President of the Brake Shoe and Castings Div.

Norton Co. — **Clarence W. Daniels**, Plants Engineer and a Director of the company, retired after 36 years of service. He is succeeded by **Allan F. Hardy, Jr.**

Aircraft Industries Assoc. of America, Inc.—**Admiral DeWitt C. Ramsey, USN**, (retired) has been elected President. **Harold Mansfield**, Director of Public Relations and Advertising, Boeing Airplane Co., has been elected National Chairman of the Public Relations Advisory Committee.

American Brake Shoe Co. — **Gilfry Ward** has been appointed Vice-President in Charge of Sales, American Manganese Steel Div.

Motor & Equipment Wholesalers Assoc. — Following officers have been elected for 1949. President, **John M. McClure**; Vice-President, **James C. Parker**; Secretary, **William D. Myers, Jr.** and Treasurer, **George E. Hull.**

Adel Precision Products Corp.—**Fred T. Miller** and **R. A. Stumm, Jr.**, have been elected to the Board of Directors, as vice-presidents.

Necrology

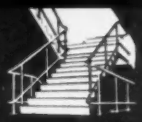
Marius Berliet, 84, founder of the automobile company bearing his name, died recently at Cannes, France.

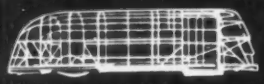
Charles F. Newpher, 60, executive vice president of the National Screw & Mfg. Co., Cleveland, O., died May 15, 1949.

Frank Adair Leovy, 79, former vice chairman of the board, Gulf Oil Corp., died on June 2 in Pittsburgh.

Edward M. Sheehan, director and former president, National Standard Parts Association, died on May 29 in Pittsburgh.

Michigan WELDED STEEL TUBING





The Modern Electric Resistance Welded Steel Tubing

ROUND

SQUARE-RECTANGULAR

Can be BENT also . . .

FLANGED, EXPANDED, TAPERED, DEPRESSED, BEADED, EXPANDED BEADED, ROLLED, EXTERNAL UPSET, INTERNAL UPSET, SPUN CLOSED, FORGED, SWEDGED, FLANGED, FLATTENED, SWAGED, PUNCHED

America is the "general store" of the world where almost anything can be bought, from "a pin to a piano." The far-sighted use by Men of Vision in business and industry of the most efficient and adaptable methods of manufacture has made this possible.

MICHIGAN WELDED STEEL TUBING is used by manufacturers as a low-cost solution to thousands of fabrication problems, because it simplifies design, reduces weight, eliminates inefficient operations. Whether you wish to form and machine the parts in your plant or order them prefabricated by Michigan you will find this tubing exceptionally uniform in structure. Available in round, square and rectangular shapes, and a wide variety of sizes.

Engineering advice and technical help in the selection of tubing best suited to your needs. Address your inquiries to:

Michigan STEEL TUBE PRODUCTS CO.

More Than 30 Years in the Business

9450 BUFFALO STREET • DETROIT 12, MICHIGAN

FACTORIES: DETROIT, MICHIGAN • SHELBY, OHIO

DISTRIBUTORS: Steel Sales Corp., Detroit, Chicago, St. Louis, Milwaukee, Indianapolis and Minneapolis—Miller Steel Co., Inc., Hillside, N. J.—C. L. Ryland, Dayton, Ohio—Dirks & Company, Portland, Oregon—James J. Shannon, Milton, Mass.—Service Steel Co., Los Angeles, Calif.—American Tubular & Steel Products Co., Pittsburgh, Pa.—Strong, Carlisle & Hammond Co., Cleveland, Ohio—Drummond, McCall & Co., Ltd., Toronto, Canada.

General News

(*Continued from page 23*)

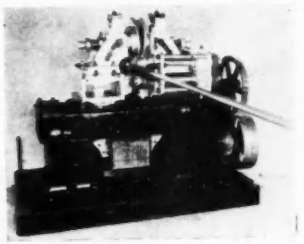
Chevrolet Engineer Heads Detroit SAE Section

A. C. Hazard, acoustic engineer of Chevrolet, will take office July 1 as chairman of the Detroit Section, Society of Automotive Engineers. Mr. Hazard, who has served on the SAE Board of Directors for several years, was vice chairman for 1948-1949. L. I. Woolson, operating manager of DeSoto, has been elected vice chairman of the SAE section. E. N. Cole, chief engineer of Cadillac, has been elected secretary, and F. W. Marschner, administrative assistant of GM's New Departure Div., has been reelected treasurer. The specialized activities of the Detroit SAE group will be under direction of T. N. Kelly, Smith-Morris Co., aeronautics; K. E. Coppock, Fisher Body, body engineering; P. J. Kent, Chrysler, junior activities; J. B. Emerson, Marvel-Schebler Carburetor, Mid-Michigan activities; P. H. Pretz, Ford, passenger car activity; J. M. Shatzel, Federal Motor Truck Co., production activity; H. C. McCaslin, Willys-Overland Motors, regional activity; J. A. Bolt, University of Michigan, student activity; and G. F. Roddewig, GMC Truck & Coach, truck and bus activity.

Michigan Steel Tube Products Celebrates Third of Century

Michigan Steel Tube Products Co., Detroit, Mich., is celebrating a third of a century in the manufacture of electric resistance welded steel tubing this year. The founder of the company was Charles E. Miller who has continued as president and general manager throughout this period. Plants are located in Detroit, Mich. and Shelby, O. The company was organized Oct. 15, 1916, in Detroit to produce welded steel tubing by the oxy-acetylene process. The original plant floor space when the company started in business was 30,000 sq ft, with 65 employees. Present floor space is 245,550 sq ft and the company employs 550. Maximum production capacity was 600,000 ft per month in 1916, today it is 6 million.

In the early days, Mr. Miller says, 75 per cent of production consisted of straight tube. As facilities were added, and as the automotive and other industries became familiar with the tube welding process, the type of product changed to 75 per cent formed and fabricated parts and only 25 per cent straight tube.



This is the first electric resistance welder built for welding light wall tubing. It was constructed by O. Parpart in 1896, and this machine is owned by Michigan Tubing.

Michigan was the first company granted a license to manufacture electric resistance welded steel tubing as covered by the Johnson patents. The process permits great welding speed with more reduction in electric current consumed, and is said to use less material in a narrower strip for welding.

In comparing Michigan tube prices today with those charged when the company was organized in 1916, Mr. Miller asserts that the increase has been only 10 per cent. This, despite the rise in the cost of steel and the 700 per cent increase in labor costs. He attributes this "hold the line" price to constant progress made at Michigan in the development of new methods of manufacture and the constant acquisition of new equipment.

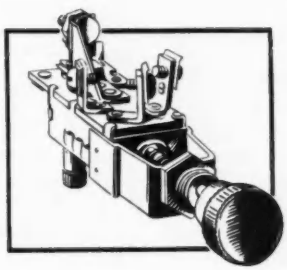
(*Turn to page 60, please*)

BUSINESS IN MOTION

To our Colleagues in American Business . . .

The device you see pictured here is an automobile light switch which controls parking and driving lights. Probably few motorists have ever seen such a switch, because the body of it is concealed under the dash or back of the instrument panel. People see only the knob. Because the operation of such a switch is so simple and reliable, probably most people think it is equally simple in design.

The fact is, however, that its simplicity and reliability of operation are protected by design and materials that foresee the conditions and contingencies of use. This is typical of a great many products which are taken for granted by people who never realize how much forethought has been given to the creation of hidden values that assure satisfaction.



Take the matter of selection of materials. The switch uses steel in several types and forms, brass, phosphor bronze, silver, canvas base bakelite, a felt washer to exclude dust, a plastic, and if you include the fuse, lead and glass. All told, there are some 20 main parts. Of these, four are made of Revere phosphor bronze, used for contacts, contactor, and rivets, these being the parts in which the special qualities of phosphor bronze are essential.

The fact that the use of Revere phosphor bronze is confined to four small parts illustrates a basic Revere policy, which is that we recommend Revere Metals only for the purposes for which they are better suited. If we were asked if we would recommend brass for the bracket and case, we would say that the steel being used is perfectly suitable, should last as long as the car, and has a minimum cost.

We like to sell Revere Metals, but not to our customers' disadvantage. Our Technical Advisors are in constant consultation with manufacturers and do not hesitate to suggest whatever material will enhance performance or save money. Recently, for example, one of these engineers found a customer using a phosphor bronze for a cover plate, and remarked that a certain nickel silver would serve as well and cost somewhat less, since it would have adequate springiness, strength, and corrosion resistance in that application. On the other hand, substitution of phosphor bronze for nickel silver has been recommended from time to time. It all depends upon the needs of the specific application.

This attitude of Revere's is by no means unique; it is to be found throughout American industry. The one essential to make it resultful is that the supplier be taken as far as possible into the manufacturer's confidence, because only then can the supplier's knowledge be made available.

Every company is entitled to use the brains as well as the products of the firms from which it buys. Are you employing both?

REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

☆ ☆ ☆

Executive Offices:

230 Park Avenue, New York 17, N. Y.

General News

(*Continued from page* 58)

Elect Thompson Chairman of Munitions Board Air Group

F. C. Crawford, president, Thompson Products, Inc., of Cleveland, was elected Industry Chairman of the Munitions Board Aircraft Industry Advisory Committee at its first meeting recently in Washington. The committee is composed of representatives of aircraft and component manufacturers, and other companies which may be called on to produce aircraft, engines, or parts in the event of mobilization. It serves both the Munitions Board and the National Security Resources Board.

A subcommittee to study security problems in individual plants will include L. C. Goad, vice president, General Motors Corp., Detroit, chairman; LaMotte Cohu, president, Consolidated Vultee Aircraft Corp., San Diego, Calif.; and C. E. Wilson, president, General Electric Co., Schenectady, N. Y. Another subcommittee will study the industry's relations to subcontractors with particular reference to the mobilization program. Chairman is Malcolm P. Ferguson, president, Bendix Aviation Corp., Detroit; and members are J. H. Kindelberger, president, North American Aviation, Inc., Los Angeles, Calif., and J. Carlton Ward, Jr., president, Fairchild Engine and Airplane Corp., Hagerstown, Md.

A subcommittee on subcontracting will also study a request by Dr. Richard H. Rush, director of the National Security Resources Board's aircraft division, for an advisory committee view on the desirability of setting up a detailed mobilization plan for suppliers of component parts.

Those present from industry were: LaMotte Cohu, president, Consolidated Vultee Aircraft Corp., San Diego, Calif.; J. H. Kindelberger, president, North American Aviation, Inc., Los Angeles; G. F. Titterton, Grumman Aircraft Engineering Corp., Bethpage, N. Y.; Harry T. Rowland, vice president (alternate for Glenn L. Martin, president), Glenn L. Martin Co., Baltimore, Md.; J. Carlton Ward, Jr., president, Fairchild Engine & Airplane Corp., Hagerstown, Md.; Thomas Knowles, Goodyear Aircraft Corp., Akron, O.; F. C. Crawford, president, Thompson Products, Inc., Cleveland; C. C. Pearson, executive assistant to the president, Curtiss-Wright Corp., Woodridge, N. J.; H. M. Horner, president, United Aircraft Corp., E. Hartford, Conn.; L. C. Goad, vice president (alternate for T. M. Archer, vice president), General Motors Corp., Detroit; M. P. Ferguson, president, Bendix Aviation Corp., Detroit.

Details of New German Tractor

In the new German Stihl tractor, the engine is flanged to the central tube which takes the place of the frame. The drive shaft passes through this tube to the transmission which is combined with the differential. There are three forward (1.9, 3.5 and 8.7 mph) and one reverse speed, and a power take-off with two speeds which may be selected by means of a small lever. The power take-off shaft is also extended forward to approximately the center of the tractor for driving a 4½ ft mower attachment through a universal joint and double V-belts. The rigid front axle is drawn up high to give a ground clearance of 15½ in. For turning on the spot the wheels may be braked individually. Provision for locking the differential is made. The hand brake for parking acts only on the outside of a drum adjacent to the transmission.

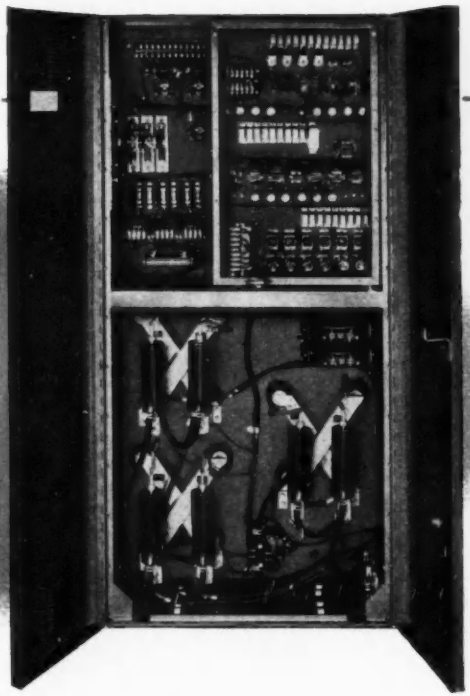
The engine is an air-cooled single-cylinder Diesel of 10 to 12-hp at 1800 to 2000 rpm. It is a two-stroke cycle engine with uniflow scavenging (tangential intake ports and exhaust valve in the cylinder head). The exhaust valve is operated through push rod and rocker arm from a cam directly on the crank shaft. The engine weighs about 175 lb. The axial cooling blower is driven by V-belt at three times engine

(*Turn to page* 94, *please*)

YOU CAN BE **SURE**.. IF IT'S

Westinghouse

For your Resistance Welding Applications



NOW...

a 3-PHASE CONTROL

cuts kva demand in half

Here's a new, cost-cutting answer to resistance welding problems caused by power use restrictions, excessive power costs or poor weld quality. It's the Westinghouse 3-phase, low-frequency welding control that cuts kva demand in half, while providing good welds on all types of metals.

Rusty or scaly steels, aluminum, brass and steel alloys join easily and the job goes smoothly because there's less tip pickup . . . less spitting at the electrodes. This is because the control, which is designed to spread kva over the three phases, distributes the load and provides for a smooth flow of heat into the metal. Kva demand is less because of the reduction of secondary reactance that accompanies operation at lower frequencies.

This is a complete packaged unit that controls all mechanical and electrical functions for the welding machine. It can be mounted on the floor or on the side of the machine. A swing-out panel provides easy access to all components and circuits. It can be applied to existing installations by changing the welding machine transformer.

For complete details, see your Westinghouse representative, or your local resistance welding machinery agent. Ask for B-4341. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh, Pa. J-60718

Westinghouse

ELECTRONIC CONTROL

Business in Brief

Written by the Guaranty Trust Co., New York, Exclusively for AUTOMOTIVE INDUSTRIES.

General business activity declined slightly during the week ended May 7. Department store sales and electric power production were lower than in the preceding week, while railway freight loadings, crude oil output, bituminous coal production and construction increased. The *New York Times* index of activity for the week ended May 21 stands at 144.1, as compared with 145.4 in the preceding week and 150.7 a year ago.

Sales of department stores during the week ended May 21, as reported by the Federal Reserve Board, equaled 280 per cent of the 1935-39 average, as compared with 285 in the week before. Sales were five per cent below the corresponding distribution a year ago, as against a preceding decline of three per cent.

Electric power production declined less than seasonally during the week ended May 21. The output was 3.3 per cent above the corresponding amount in 1948, as compared with a similar advance of 2.9 per cent shown for the preceding week.

Railway freight loadings during the same period totaled 773,911 cars, 0.3 per cent more than the figure for the week before but 12 per cent below the corresponding number recorded in 1948.

Crude oil production in the week ended May 21 averaged 4,903,000 bbl daily, 4550 bbl more than in the preceding week but 535,300 bbl below the comparable output in 1948.

Production of bituminous coal and lignite during the same week is estimated at 11,135,000 net tons, 0.3 per cent more than the output in the week before but 18.8 per cent below the corresponding quantity in 1948.

Civil engineering construction volume reported for the week ended May 26, according to *Engineering News-Record*, was $193,679,000, or 23 per cent more than the preceding weekly figure and two per cent above the comparable sum in 1948. The total recorded for 21 weeks of this year was 18 per cent more than the corresponding amount in 1948. Private construction for the period was 20 per cent above that a year ago.

The wholesale price index of the Bureau of Labor Statistics during the week ended May 24, at 156.5 per cent of the 1926 average, was 0.3 per cent more than in the preceding week but 4.9 per cent below the corresponding figure in 1948. The advance in the general index reflected chiefly price increases in foods and farm products.

Member bank reserve balances decreased $275 million during the week ended May 25. Underlying changes thus reflected include declines of $687 million in Reserve bank credit, $25 million in money in circulation, $358 million in Treasury deposits with Federal Reserve banks and $27 million in non-member deposits and other Federal Reserve accounts.

Total loans and investments of reporting member banks increased $105 million during the week ended May 18. A decline of $161 million in commercial, industrial and agricultural loans was recorded, marking the 18th consecutive weekly reduction. The sum of these business loaons, $13,747 million, shows a net decrease of $555 million in 12 months.

DUREX-100 ENGINE BEARINGS CARRY THE LOAD

More and more automobile and truck manufacturers are recognizing the unique ability of Durex-100 engine bearings to stand up under the demands of today's high compression engines . . . to carry the load long after conventional bearings fail.

The Durex-100 is in use as original equipment in Buick, Cadillac, Oldsmobile, GMC Trucks, and other automobile and truck engines, both gasoline and diesel.

There's a reason behind this constantly widening acceptance. Moraine engineering and experience has produced a bearing that embodies all the advantages of high lead base babbitt lining, while minimizing its susceptibility to fatigue failure. In the laboratory and in the field, in war and in peace, Durex-100 bearings have proved more satisfactory.

If your engine plans call for main or connecting rod bearings superior in conformability, embedability, resistance to fatigue and corrosion, and with a high melting point, look to Moraine for the answer . . . Durex-100 engine bearings.

Durex-100 bearings are ideally suited for gasoline or diesel engine application in automobiles, trucks and busses.

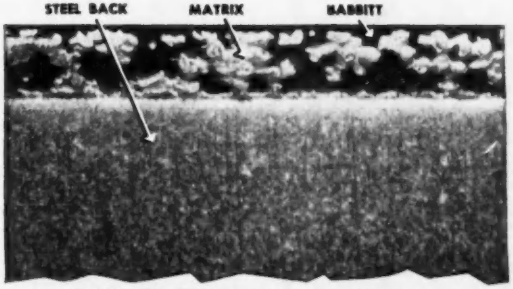


PHOTO-MICROGRAPH OF CROSS SECTION OF DUREX-100 BEARING. MAGNIFIED 35 TIMES

THE MATRIX MAKES THE DIFFERENCE

Steel-backed intermediate matrix or porous copper-nickel bonds mechanically, as well as metallurgically, with thin high lead babbitt overlay.

MORAINE PRODUCTS DIVISION OF GENERAL MOTORS

DAYTON, OHIO

DUREX-100 ENGINE BEARINGS . . . BY MORAINE

New Production Machines

(*Continued from page 47*)

and automatically sizing large Diesel cylinder liners—5.750 in. in diameter, 15 in. long. Production is at the rate of 25 an hour, removing from 0.001 to 0.005 in. of stock. Size is held to less than 0.001 in. tolerance while surface finish is held 12 to 16 microinch (rms).

In connection with Micromatic two-spindle honing machines, this is the first example of the application of automatic loading and unloading to effect increased productivity without any sacrifice in accuracy. Shown in Fig. 4 is the honing of bores of hardened automotive gears at the rate of 300 an hour. Size is held to less than 0.0003 in. tolerance by electronic Microsize control. Taper and out-of-roundness is less than 0.0001 in. while surface finish is held at 12 microinch (rms).

Fig. 5 shows the new general purpose honing machine designed for use in tool rooms and for engine reconditioning. The machine is shown with a lateral indexing table fixtured for honing a six cylinder automotive block at the rate of 6 per hour. Size is held to less than 0.0005 in. tolerance on the diameter. Any desired surface finish can be generated. The head is reciprocated hydraulically. Inching of the head into the bore, the reciprocation speed, and withdrawing of the head are all controlled by the Uni-Control lever.

By mounting a riser block on the base, the machine can be adapted for honing small parts such as connecting rods. For this type of part, the machine is equipped with Signal Light Microsize.

Production of Axle Housing

(*Continued from page 36*)

by the Ford organization. As illustrated, there is a group of presses arranged about a circular indexing fixture or table, the entire assembly constituting a closed circle automatic machine.

As the tubes approach the machine on a monorail conveyor from the notching operation, the conveyor line passes through the first station of the machine and at this point the fixture automatically removes a tube and holds it in position for indexing to the first press operation.

The tube is then moved progressively through a series of four press operations as follows:

1—First form.
2—Final form and restrike.
3—Trim open end.
4—Trim entire concave surface and notch.

Upon completion of the cycle in this new machine, the fixture indexes the finished tube to the last station of the machine. This marks another of the automatic transfer stations. At this point the mechanism holds the tube in position and transfers it onto a corresponding fixture on a monorail conveyor threading its course through the station. The latter conveyor transports the work to the butt-welding machines in which two halves are welded together to form an axle housing.

Engineers in Management

(*Continued from page 43*)

siderable extent upon the foresight and skill of the chief engineer; that he supplies the imagination to build things that produce revenue; that he can make or break a company. Meanwhile he may not be adequately compensated; and he is frequently excluded from or meagerly participates in extra compensation plans. Because of existing wage differentials, young engineers increasingly tend to enter the selling end of the business. Lacking official status, some chief engineers complain that they are seriously hampered in their necessary contacts with other company executives.

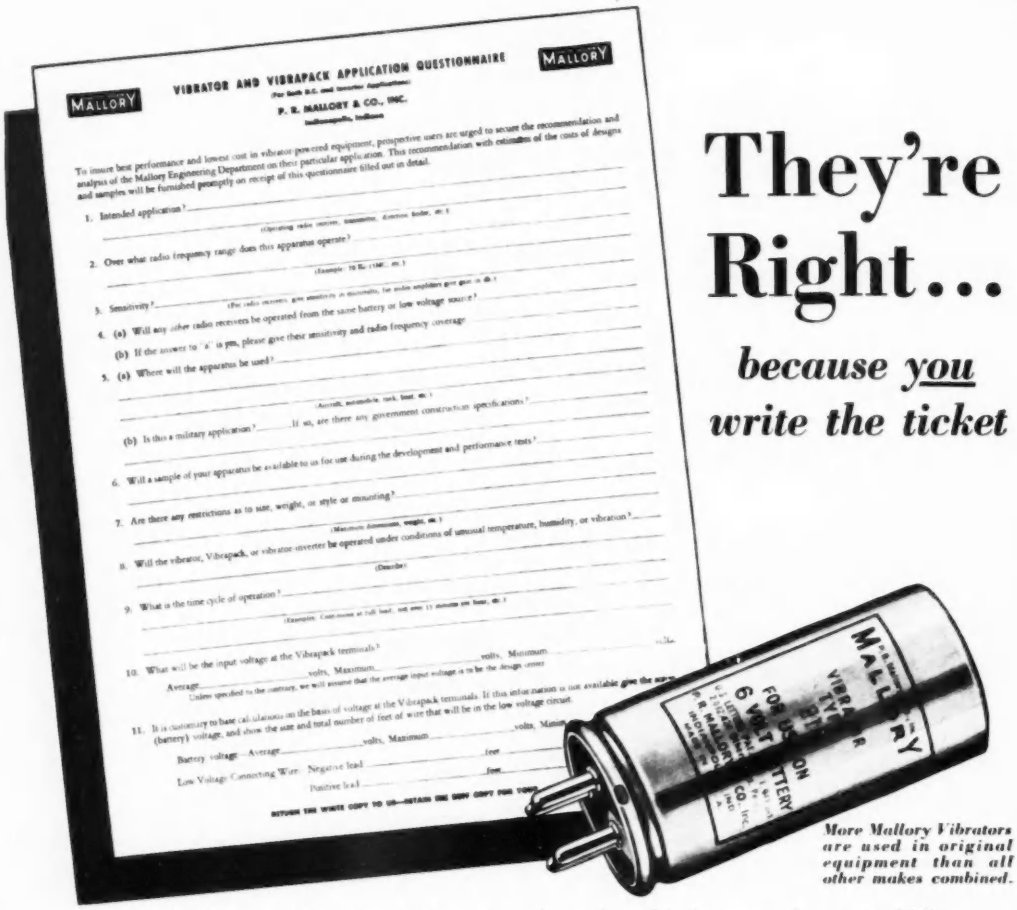
SuVeneer®

CLAD METALS

Give you high-performance surfaces with economy inside . . . for a world of profitable product fabrication!

You get the *solid* metal surface of your choice when you specify SuVENEER CLAD METAL . . . dense, non-porous, non-peeling, impermeable . . . bonded inseparably to a core of low carbon strip steel. You enjoy economy of purchase, while assuring performance values for your products inherent in the cladding metal you select. ● Quality-produced SuVeneer Clad Metals are available in easy-handling coils, precise in every specification. *Write us on your requirements.*

Superior Steel
CORPORATION
CARNEGIE, PENNSYLVANIA



They're Right...

because you write the ticket

More Mallory Vibrators are used in original equipment than all other makes combined.

Creative research is no empty slogan at Mallory. Mallory Vibrators are the world's most popular simply because engineering skill, long experience and adherence to quality ideals have made them better.

But Mallory engineers know that the finest vibrators can fail because of a power transformer design . . . or a wrong value buffer capacitor. That's why they want to know the whole story of your problem.

That's the reason for the inquisitive questionnaire shown above. It's the reason why so many Mallory Vibrators are right for the job. With this information, Mallory engineers can make *intelligent* and *profitable* recommendations.

Do you have a supply of these "tell-all" questionnaires in your engineering files? If not, we earnestly suggest you give your Mallory representative a call—or write to Mallory direct. Do it now. And remember, too, that standard Mallory Vibrators are quickly available from authorized Mallory distributors.

Vibrators and Vibrapack* Power Supplies

P. R. MALLORY & CO., Inc.

MALLORY

P. R. MALLORY & CO., Inc., INDIANAPOLIS 6, INDIANA

SERVING INDUSTRY WITH

Capacitors — Rectifiers
Contacts — Switches
Controls — Vibrators
Power Supplies
Resistance Welding Materials

*Reg. U. S. Pat. Off.

NEW PRODUCTION AND PLANT EQUIPMENT

For additional information please use coupon on page 54

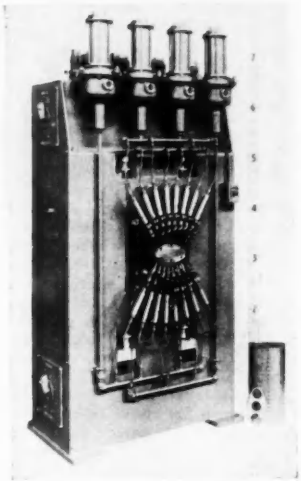
(*Continued from page 50*)

the face of the slides and the dies for the removal of the stock.

All gears and driving unit are enclosed in the box type crown. Driving links of the toggle mechanism, and bearings, are lubricated by a constant flow of oil under pressure. Compact design of the press reduces height and saves floor space. There are no overhanging brackets or other projections.

Operating at 8 strokes per minute, the press has a capacity of 200 tons for the inner slide, and 120 tons for the blankholder slide. The press is equipped with a 35-ton pneumatic cushion at 100 lb air pressure, 10 in. travel. Inner slide is provided with 23 in. stroke and 5 in. adjustment. Bed area is 45 in. by 72 in.

B-114—Multi-speed Resistance Welder



Taylor-Winfield special airdraulic 16 gun multi-speed welder with two 50 KVA transformers

The Air-Speed type of multiple electrode resistance welder is designed by Taylor-Winfield Corp., Warren, Ohio, to take advantage of the compact hydraulic gun, and to eliminate need for an hydraulic pumping unit. Air-oil boosters operate through air valves working in sequence, connected to the main air supply to provide welding force. Each welding gun passes welding current when a contactor, actuated by the sequencing mechanism, energizes the primary of the welding transformer.

The Air-Speed illustrated welds baffles in automobile mufflers made of 0.040 in. zinc coated steel at the rate of 480 mufflers per hr. It makes 16 welds per muffler in four progressive groups of four welds per group for a total of 7,680 welds per hr. Two pairs of series welds (four welds) followed by a like set of four welds—a total of eight welds—are made on top the muffler. In sequence, two groups of welds, or eight welds are made on the bottom. This sequence welding eliminates need for an internal expanding work arbor. Each of two 50 KVA transformers makes two series welds per group.

B-115—New Model Lathes

New models of engine lathes and tool room lathes developed by Springfield Machine Tool Co., Springfield, Ohio, provide sixteen spindle speeds, increased capacities, and optional speed ranges for complete coverage of work requiring

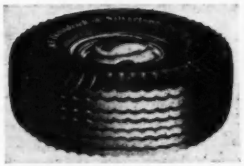
(*Turn to page 70, please*)

NEW ★ PRODUCTS

For additional information please use coupon on page 54

C-137—Heavy Duty Highway Tire

A tire named the "Super Highway" for high speed, long distance service in over-the-highway hauling is being built by the B. F. Goodrich Co., Akron, Ohio. The "Super Highway" tire is made in sizes from 8.25-20 ten ply rating through 11.00-24 twelve ply rating and operates under the standard load and



B. F. Goodrich "Super-Highway" tire

inflation schedule for the various sizes.

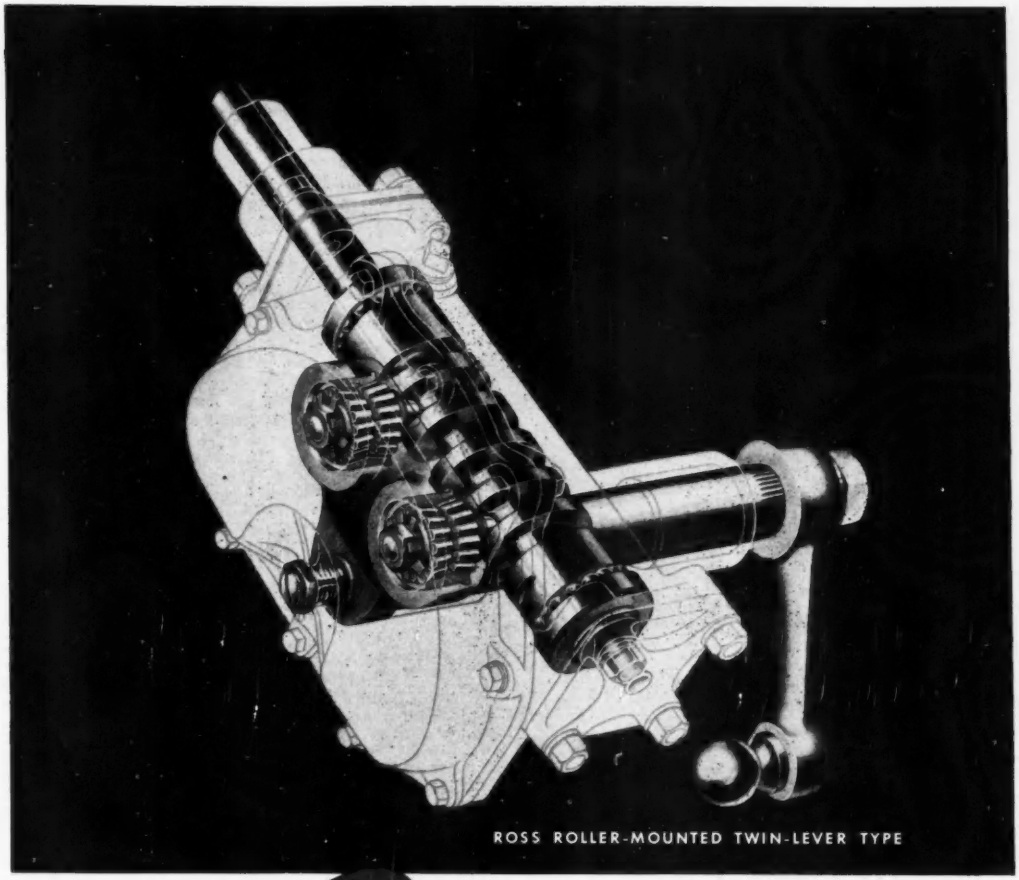
The tire is reported to have a flatter design for greater road contact, the non-skid depth of the tread averaging 13.5 per cent deeper than standard tires and the crown thickness averaging 21 per cent more. The body is made with rayon cord and the company's nylon shock shield, which reduces possibility of tread separation. Cords are the weftless, full floating even tension type which help reduce tire growth and provide added bruise resistance.

Designed for even wear on either free-rolling or power wheels, extra tread grooves help dissipate heat and distribute flexing, while dual-tread construction provides cool running, the company states.

C-138—Portable Paint Heater

An improved viscosity control paint heating and recirculating system presented by the Industrial Sales Co. of California, located in Pasadena, maintains uniform viscosity of all types of paint materials by constant tempera-

(*Turn to page 74, please*)



ROSS ROLLER-MOUNTED TWIN-LEVER TYPE

Ross

Cam & Lever STEERING

EASE...STABILITY
ECONOMY

For Any Job
Large or Small

WE WOULD BE PLEASED TO WORK WITH
YOU ON ANY OF YOUR STEERING PROBLEMS

ROSS GEAR AND TOOL COMPANY • LAFAYETTE, INDIANA

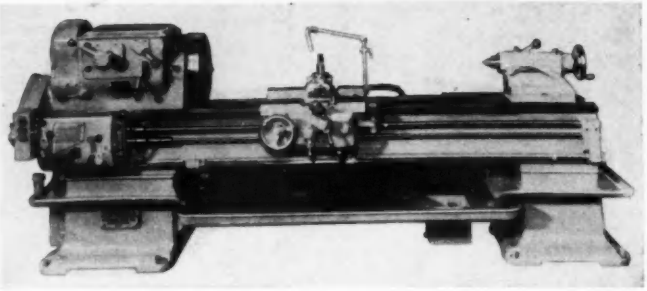
NEW PRODUCTION AND PLANT EQUIPMENT

For additional information please use coupon on page 54

(*Continued from page 67*)

slow speeds for heavy cuts and high speeds for carbide tooling.

The simple three lever gear shifting system is designed without any pass through gears and is therefore operated easily. Shifting levers require a minimum of shifting for normal sequence of lathe operations. The headstock lubrication oil sump has been located in the cabinet leg instead of the headstock to minimize heat rise of the headstock under heavy high speed spindle operations.



Springfield lathe manufactured in both engine and tool room models

New design feed box incorporates lifetime lubricated sealed ball bearings wherever possible. Sixty threads and feeds are available, with optional ranges that include 11½ and 27 pitch thread leads in addition to other standard pitches. Loose change gears are used only when transposing to metric threads leads or to obtain ranges of extremely special nature.

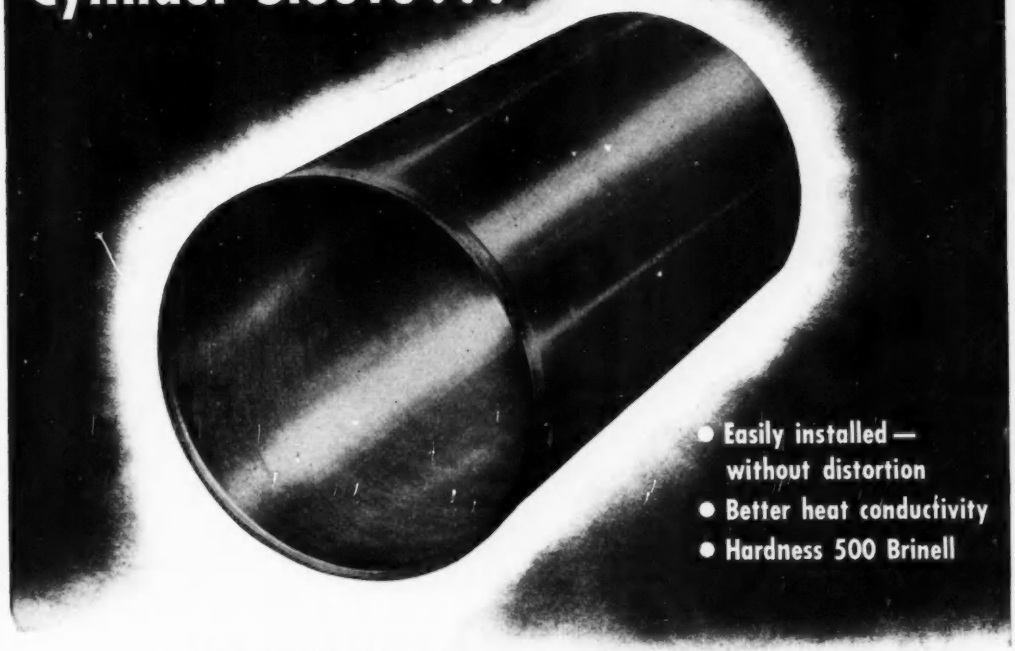
Heavy beds with either precision hand scraped bed ways or with replaceable hardened tool steel face way inserts are available. Beds are heavily girthed and of the proper proportion for support of the tool throughout the range of swing. The carriage and apron give complete rigidity.

B-116—Bonding Process Equipment

Equipment ranging from bench size to large production units is available from Western Sealant, Inc., Culver City, Calif., for bonding dissimilar materials in parts designed to withstand extreme lateral or internal hydrostatic and aerostatic pressures. Primarily for bonding plastic or neoprene to metals, or ferrous to non ferrous metals as in bushings or inserts used in aircraft, electronic, oil tool, or hydraulic equipment industries, this batch immersion method uses a new bonding agent developed by Western Sealant, Inc. In addition to bonding, the process eliminates microporosity by impregnation with the bonding agent which has a wide range of resistance to operational temperatures and chemical solvents. Finished parts show no visible signs of treatment, and anodized, plated, or machined areas are not affected, it is said.

Such dissimilar materials as glass to metal, neoprene to metal, plastic to metal, steel inserts in aluminum, aluminum to aluminum, and brass to aluminum have been bonded by this process.

The new Thompson *Copper-coated* Cylinder Sleeve . . .



- Easily installed — without distortion
- Better heat conductivity
- Hardness 500 Brinell

CONVENTIONAL CYLINDER SLEEVES are often distorted during installation because of the tight press fit they require. Even with great care and skill this distortion often occurs.

To remedy this situation and gain other important advantages, Thompson Products now offers a new COPPER-COATED cylinder sleeve.

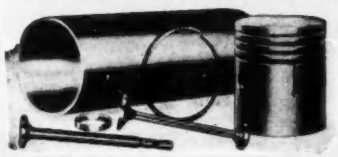
The soft copper coating on the outside surface yields readily when the sleeve is press-fitted. This greatly reduces the danger of distortion.

For the same reason the copper "fills in" any irregularities in the contours of the fit, assuring contact of the sleeve and block at all points. This means better and more uniform conductivity of heat from the cylinder to the cooling system.

The bearing surface of this new sleeve has a deep hardness of 500 Brinell for longer wear in heavy-duty service.

Thompson Products is one of the largest producers of wet and dry cylinder sleeves for original equipment and replacement use in all types of engines, automotive and industrial. These sleeves are part of a complete line of engine and chassis parts engineered for durability and economical service.

Thompson improvements in precision parts engineering include Steel-Belted Pistons, U-Flex Oil Control Rings, Cylinder Sleeves, Valve Seat Inserts, Sodium-Cooled Valves, Valve Rotocaps.



Thompson Products

CLEVELAND • DETROIT • LOS ANGELES • ST. CATHARINES, ONTARIO

WE WILL PROVE THIS...

Under today's conditions there are many operations on which Ingersoll-Rand Air Power equipment saves enough to pay for itself *in a matter of days*

At no cost to you, I-R field engineers will make a job study with actual Air Tool performance tests on your own operations in your own plant. You can use the equipment yourself, try it in any way you like, keep your own time and cost records. Then you will know how much it can save you and how soon it will pay for itself on your jobs. To have this job study made in your plant, call your I-R branch office now.

Similar studies in many plants have proven this important fact: Ingersoll-Rand Air Power equipment which, a few years ago, saved enough to pay for itself in 30 days, now pays for itself in only 18 days on the same operations under today's conditions.

Ingersoll-Rand

11 Broadway, New York 4, N. Y. 320-B

NEW PRODUCTS

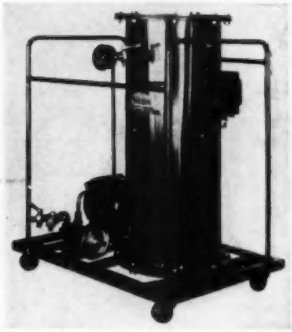
For additional information please use coupon on page 54

(*Continued from page* 68)

ture control. Named Vicon, it is for use with spray painting systems, and is installed between the pressure tank or gravity feed system and the spray gun.

The unit controls paint viscosity through application of the law that viscosity of a liquid (paint material) is reduced by raising its temperature. It is capable of heating all paints and finishes to any predetermined temperature between 100 and 200 F. Its hermetically sealed and evacuated heat exchanger contains a buffer fluid, eliminating water level maintenance. Its recirculating system constantly circulates the material through the hose, preventing variable heat loss experienced when using long hoses or when spraying intermittently.

A portable unit, the Vicon paint heater is mounted on a caster base ready for connection to pressure tank, spray gun and power outlet. A maximum of fifteen minutes is required for preheating. Motor is explosion proof. Wiring, switches and controls are vapor proof.

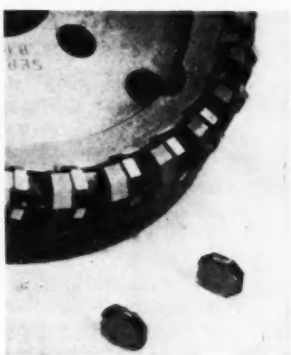


Vicon paint heater of the Industrial Sales Co. of California

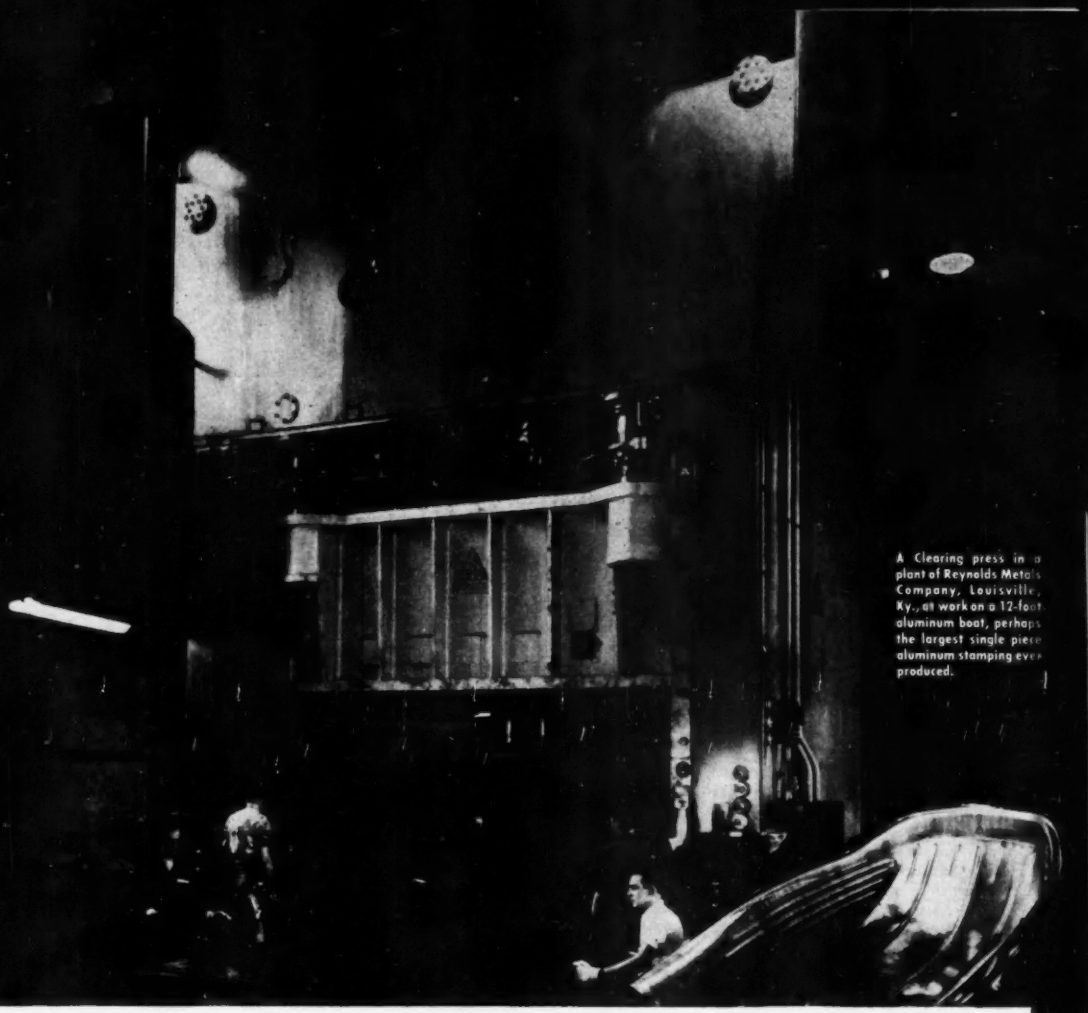
C-139—Fence Milling Cutter

A high production cast iron fence milling cutter added to the line of "Future Mill" cutters, manufactured by Diamond-Detroit, Inc., Detroit, Mich., is designed for feed rates up to 60 in. per minute and utilizes a solid carbide octagonal-shaped blade permitting sixteen production runs without regrinding or resharpening any cutter. When a blade becomes dull after cutting on one of the 45 deg champfers, it is merely indexed to the next position. After eight runs the blads is reversed and an equal number of runs is obtained from the other side. The necessary rake, relief and clearance angles are ground into the cutter body. Accuracy in uniform blade height is accomplished by a locating pin set beneath the blade. These locating pins are finished to close tolerances through use of special carbide burring tools, which unlike grind-

(*Turn to page* 76, *please*)



Diamond-Detroit cast iron face milling cutter



A Clearing press in a plant of Reynolds Metals Company, Louisville, Ky., at work on a 12-foot aluminum boat, perhaps the largest single piece aluminum stamping ever produced.

Giving Engineers a Real Chance to Cut Costs

Large stampings require fewer subsequent assembly operations and often make a more satisfactory product. With Clearing presses, this logical engineering approach to lower production costs is entirely practical, because the precise operation of Clearings produces accurate stampings and increases the life of elaborate, expensive dies.

When you plan your work to utilize the outstanding features of a Clearing press, you insure maximum results and minimum costs. You're in the best possible position, competition-wise, to broaden your market and secure additional business, even in tough going. If these statements interest you, we'll be happy to submit convincing proof they're true.

CLEARING MACHINE CORPORATION

6499 West 65th Street **Chicago 38, Illinois**

CLEARING PRESSES

CMC CLEARING

THE WAY TO EFFICIENT MASS PRODUCTION

NEW PRODUCTS

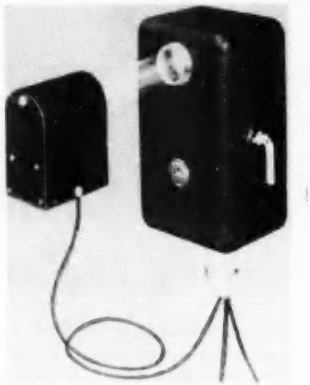
For additional information please use coupon on page 54

ing wheels, do not lose size even with cutters of large dia. The same is true with the bearing for the blade on the inside edge which determines the peripheral runout.

The cutter provides a low cost blade, either discarded for milling after sixteen production runs have been obtained, or ground down to a smaller size in order to furnish sixteen more runs on some other job which has a reduced depth of cut. The rake angles incorporated in the body were established after extensive tests at the Engineering School of the University of Michigan. Successful tests of the cutter are said to have been made in the plants of two of the largest motor car manufacturers.

C-140—Photoelectric Conveyor Control

A delayed action photoelectric control, type 20DA4, has been designed by Photoswitch, Inc., Cambridge, Mass., to indicate presence of a jam on a conveyor line and to introduce conveyor stop motion or other correction.

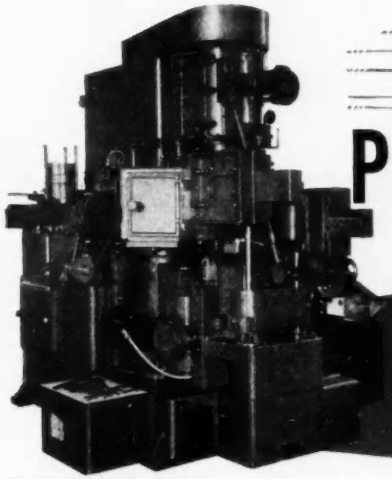


Photoswitch delayed action photoelectric control, type 20DA4

In operation a control and light source are placed on opposite sides of the conveyor so that when a case passes along the conveyor it will interrupt the light beam. Relay action in the photoelectric control occurs only when the light beam has been interrupted for a predetermined time interval, representing a longer period than would normally be required for a case to pass by. This excessive light beam interruption can be caused only by the jamming of several adjacent cases.

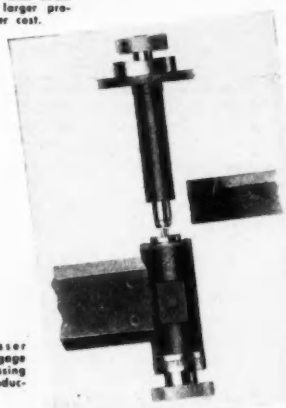
(*Turn to page 78, please*)

NON-STOP Production Booster!



The BESLY 926 with offset heads — for larger production at lower cost.

This BESLY Grinder Saves Time... Cuts Costs!



The dresser arm and gage — for dressing while producing.

Grinding your jobs *Non-Stop* on a **BESLY 926** Production Grinder (As illustrated) means considerable savings in your production costs. Less time is required to run a job because interruptions for dressing operations can be entirely eliminated.

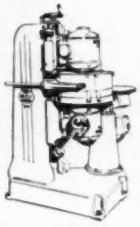
This heavy duty, vertical, double spindle grinder is equipped with offset grinding wheels and two powered dresser arms. Built-in gages permit dressers to be set exactly to work size requirements. Once the dressers are set and a job started, there are no interruptions. You can dress both the upper and lower grinding wheels while you finish your jobs... *Non-Stop!*

In addition to stepped up production, you can expect superior results in other ways. Features like the three-way adjustable heads, hydraulic spindle feeds and the exclusive angular set wheels with Besly's "Progressive Grinding Principle" all contribute to the extreme accuracy and remarkable uniformity of output which characterize the performance of this grinder.

For grinding parallel surfaces accurately on small parts such as bearing races, oil seals, thrust washers, snap rings, coil springs, etc., you can be sure the **BESLY 926** is built to do the job. Write today for complete data and illustrated literature. Learn how the advantages of **BESLY** Grinders will benefit you *productionwise.*

10 TIMES MORE OUTPUT —COSTS DOWN!

After installing a **BESLY 926** equipped with offset wheels using 30"x14"x1" BESLY Titan Abrasive Discs, a prominent automotive parts manufacturer boosted production figures on piston rings by more than ten times to over 12,000 pieces per hour with a sharp decrease in costs. Tolerances are held to .0002" for size, .0001" for parallelism and from 6 to 9 micro inch finishes.



BESLY manufactures a complete line of vertical and horizontal double spindle production grinders, vertical and horizontal all purpose disc grinders and are designers and builders of equipment for special applications. No matter what your grinding problem may be, there is a **BESLY** to serve you better. And for improved grinding finishes always order **BESLY** Titan Steelbac Abrasive Discs.

Maybe GRINDING is the Better Way . . . Better Check with

BESLY GRINDERS AND ACCESSORIES
BESLY TAPS • BESLY TITAN ABRASIVE WHEELS

BESLY

CHARLES H. BESLY AND COMPANY • GRINDER SALES and MANUFACTURING • BELOIT, WIS.

NEW PRODUCTS

For additional information please use coupon on page 56

Under the circumstances, it is generally desirable to temporarily prevent additional cases from entering the main conveyor line by stop motion control of the feeder conveyors.

The delayed action feature in the photoelectric control is for reducing relay action to only those instances when a jam occurs. The delayed action interval is adjustable from 1/20 second to 5 seconds. Relay armature motion is the only mechanical action which takes place.

Delayed action photoelectric control type 20DA4, has been designed to provide reliable continuous operation with unlimited life under exacting ambient conditions of temperature and humidity. Hermetically-sealed, oil-filled condensers and high wattage resistors are used. The entire unit including housing is designed for simple plug-in construction of all electrical connections.

C-141—New Screws In Stick Form

Screwstick—a new product of American Screw Co., Providence, R. I.—is a one-piece stick of identical small screws used in pneumatic, electric, spiral or hand-ratchet drivers for faster fastening.

Constant measured torque provides uniform tightening, eliminating guess-

American Screwstick close-up (left) and application in power fastening (right)

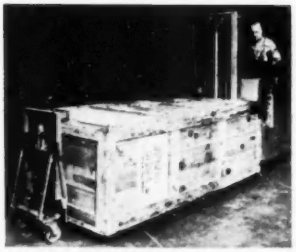
work by operator or machine. Screws are twisted off automatically and the fastening made when a predetermined torque is reached. As the tightened screw is freed from the neck, the next screw in line is automatically advanced. Amount of torque is controlled by the cross-sectional area of neck joining the screws. Head of the driven screw is burnished smooth by the next screw to be driven.

Screwsticks are now available in No. 0, 1, 2, 3, 4 and 5 dia in mild steel, brass and aluminum.

C-142—Auxiliary Long Load Lifter

Long, heavily loaded crates, export boxes and similar bulky objects up to 30 ft in length are moved rapidly, safely and economically by means of a lifting and rolling device, which is a co-ordinating unit for use with the fork trucks of the Elwell-Parker Electric Co., Ceveland, Ohio. Called Rol-a-

(*Turn to page* 82, *please*)



Elwell-Parker auxiliary load lifter, the "Rol-a-Lift"

STRENGTH COMBINED WITH BEAUTY

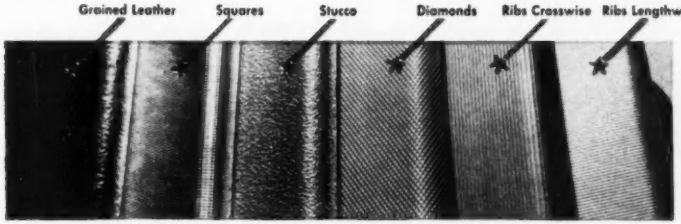
You get both with the new Reynolds Embossed Aluminum sheet finishes

● Designers' acceptance of the new Reynolds Embossed Aluminum patterns has spread rapidly—customers now acclaim it. The beauty of these smart new finishes is instantly apparent but it requires years of rugged wear to appreciate the greater rigidity, the scuff-resistant qualities embossing provides.

Above you see how three of the patterns serve in a modern motor bus interior. Ceiling is a vertical rib design; pleasing appearance and glare-reducing qualities mark its use at this point. On the dash panel a horizontal rib design adds a note of smart styling. Seat backs are protected by a diamond pattern—they take rough treatment, scuffs, dents and scratches, without showing wear. No other material serves so well, with so little maintenance, at such a low original cost.

If your product can use these new benefits without the addition of new costs, consider the range of attractive embossed patterns shown below. Remember you get a naturally pleasing finish, but it may also be painted when desirable. Scuffs and scratches are concealed by the pattern, and aluminum can be formed to modern contours, in most cases without new tool costs.

You get three times the material for production and reduced dead-weight because aluminum is ⅓ the weight of most metals. To see how your production picture can be brightened by Reynolds Aluminum, call your local Reynolds distributor or sales office listed under "Aluminum" in your classified telephone directory, or write to the address below.



FINISHES FOR ALUMINUM

Send your request for this informative book on your company letterhead and receive a copy without charge.

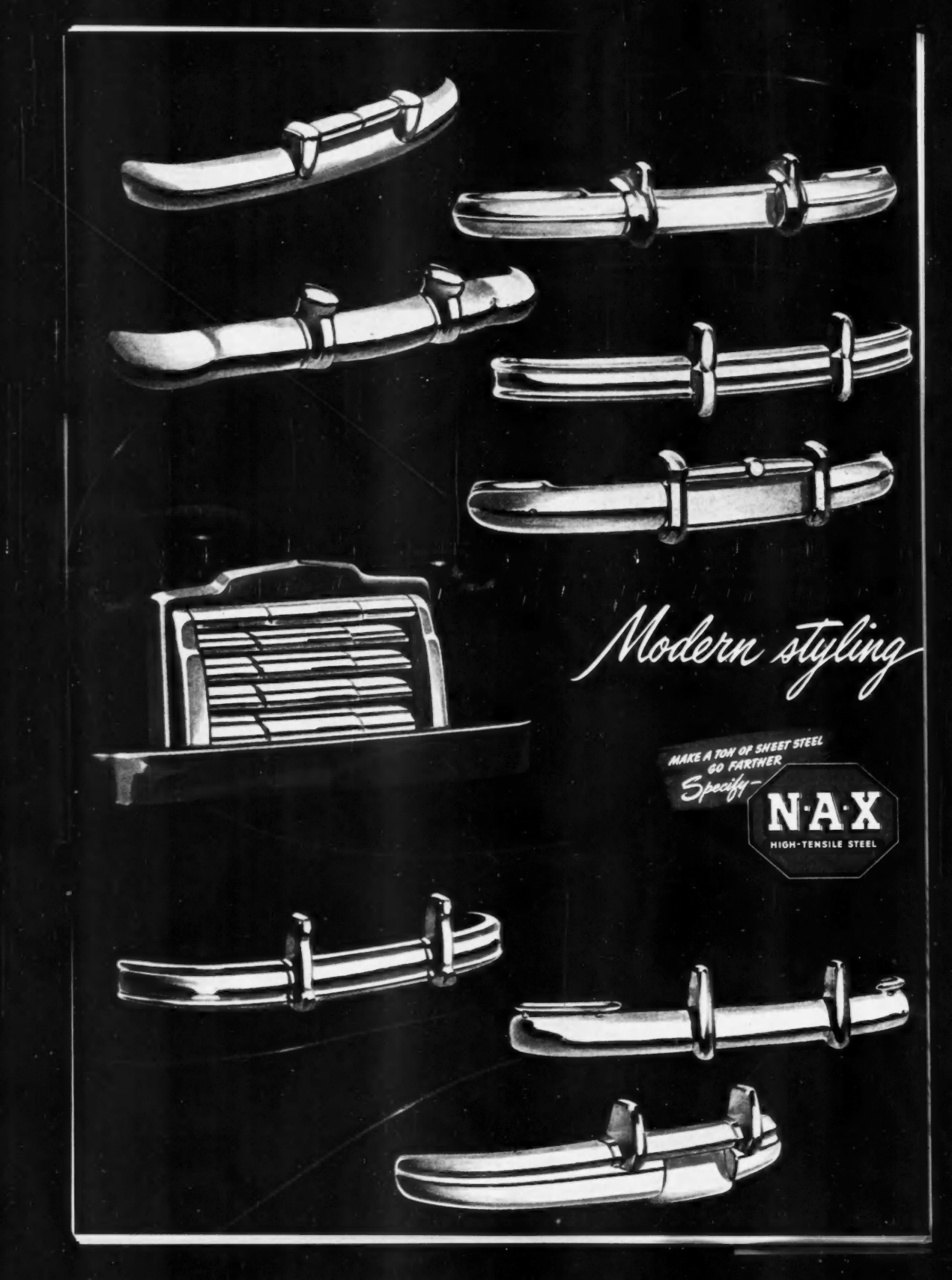
IF YOU SEE RUST... YOU KNOW IT'S NOT ALUMINUM

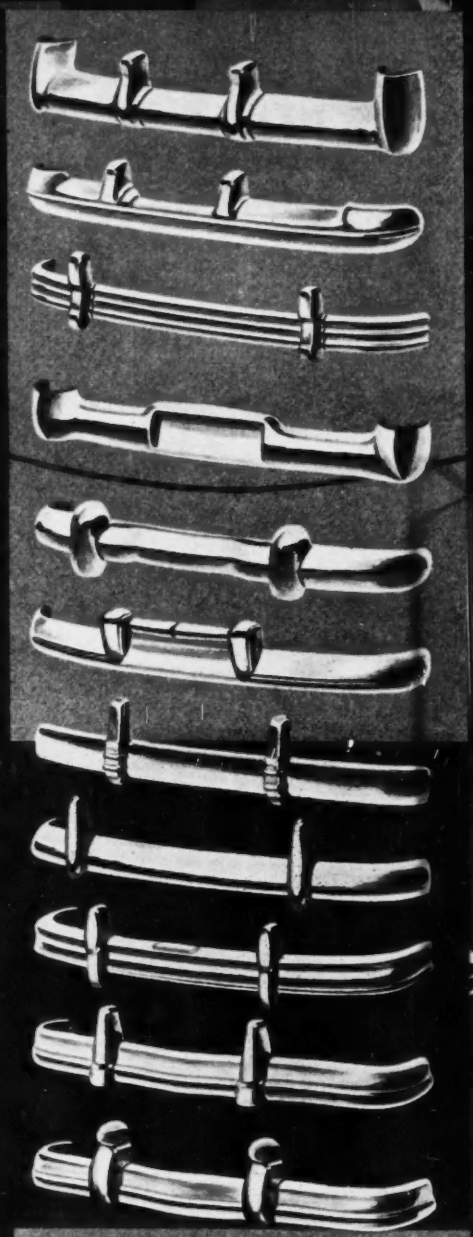
REYNOLDS METAL

REYNOLDS METALS COMPANY, Aluminum Division
2513 SOUTH 3rd STREET • LOUISVILLE 1, KY.

REYNOLDS *Lifetime* ALUMINUM

THE COMPLETE ALUMINUM SERVICE FROM BASE METAL TO FINISHED PARTS


Modern styling
MAKE A TON OF SHEET STEEL GO FARTHER
Specify—
N·A·X
HIGH-TENSILE STEEL



with ruggedness from

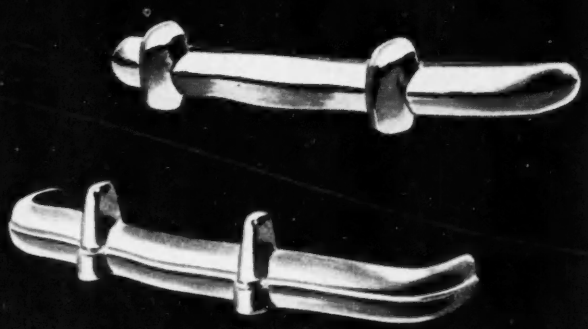
N-A-X HIGH-TENSILE

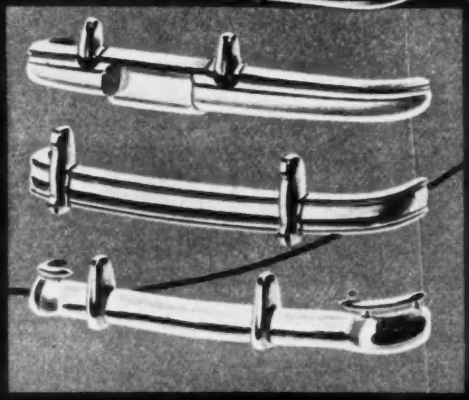
the high strength steel that can be formed into extremely difficult shapes

GREAT LAKES STEEL CORPORATION

N-A-X Alloy Division • Detroit 18, Michigan

UNIT OF NATIONAL STEEL CORPORATION





NEW PRODUCTS

For additional information please use coupon on page 54

(*Continued from page* 78)

Lift, it is built by Skarnes Engineering & Supply Co., Elwell-Parker distributor in Minneapolis, Minnesota.

Loads for which the device is useful range to 8000 lb and include equipment in factories, warehouses, stores, freight depots, cars, ships and docks. Loads formerly moved by the comparatively slow, hazardous means of rollers, can be maneuvered in close quarters with this device, for compact placement, the company states.

Roll-a-Lift combines a lifting and rolling mechanism in one unit, built in four models, all hand-operated. The heavy-duty size for loads up to 8000 lb is 43 in. high and weighs 200 lb. It has a pair of handles; a pair of forks 5 in. long, and 16 in. apart; a pair of swivel-type wheels 5 in. in dia; and a hydraulic lift jack mounted on its steel frame.

The operator pushes the forks under the forward end of the load, and lifts it by means of the jack up to 9½ in., after the power fork truck has engaged the opposite end of the load.

Swivel wheels on the Rol-a-Lift enable the power truck with fork inserted under the opposite end to push and steer the load. Distribution of weight between Rol-a-Lift and power truck doubles the power truck's capacity. For lighter applications a pair of Rol-a-Lifts only, one under each opposite end of the load, prove satisfactory.

C-143—Halo-Firing Spark Plug

A spark plug of new basic design, which delivers a 360 deg radius of fire in the form of a circle or halo, replacing the usual J-type single-wire cathode which delivers a single spark, has been brought out by the American Eagle Spark Plug Co., Detroit, Mich. This nichrome radial cathode spark plug's hot strong spark burns all gas vapors

American Eagle spark plug with nichrome radial cathode

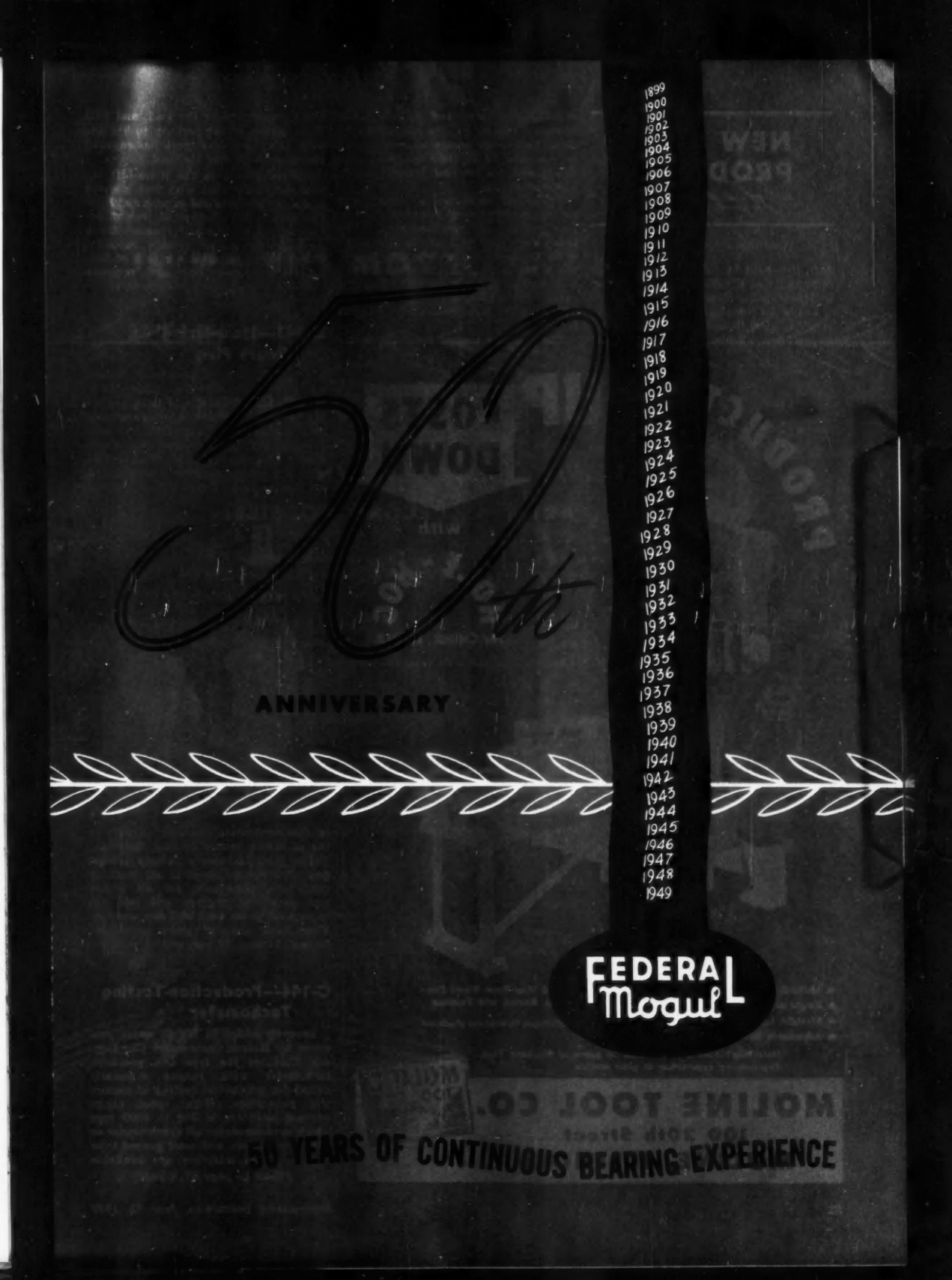
in the combustion chamber as well as the oil which causes fouling, they say.

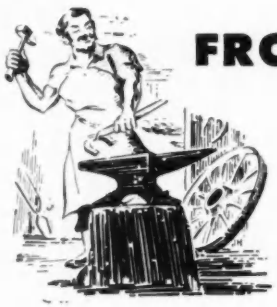
The plug features a factory pre-set gap which is constant in all working conditions, permanent for all makes and models of engines, and said not to expand under heat and compression. Four basic sizes of plugs consist of 10 mm, 14 mm, 18 mm and ⅞ in.

C-144—Production-Testing Tachometer

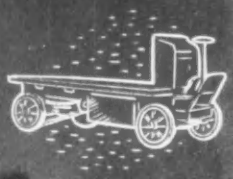
Recently added to the 48 series produced by Metron Instrument Co., Denver, Colo., is the type 48K precision tachometer with ranges especially suited for production testing of motors and generators. Total speed range without adapters is 360 to 4000 rpm which accommodates all synchronous or induction motors and most geared type motors. Head adapters are available

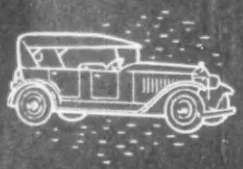
(*Turn to page* 87, *please*)


50th
ANNIVERSARY
1899
1900
1901
1902
1903
1904
1905
1906
1907
1908
1909
1910
1911
1912
1913
1914
1915
1916
1917
1918
1919
1920
1921
1922
1923
1924
1925
1926
1927
1928
1929
1930
1931
1932
1933
1934
1935
1936
1937
1938
1939
1940
1941
1942
1943
1944
1945
1946
1947
1948
1949
FEDERAL
Mogul
50 YEARS OF CONTINUOUS BEARING EXPERIENCE



FROM THE ANVIL WITH AUTOMOTIVE





THIS year of 1949 is Federal-Mogul's Golden Anniversary ...marking fifty years of continuous bearing experience. It is a milestone of special significance to the automotive world, since our own history parallels so closely the half century of world-change brought by the automobile.

Our company had its beginning in Detroit, as the Muzzy-Lyon Company, shortly after Theodore Roosevelt led his intrepid Rough Riders up San Juan Hill in the Spanish-American War. The babbitt metals, produced in one small shop employing the original partners and a helper, were bought by the pioneering builders of the first "gas buggies." They poured their bearings and shaped their crankshafts by hand from solid pieces of steel.

Those first handmade models were laboriously put together with sweat and makeshift, genius and on-the-spot design. Bearings were short-lived, as were other assemblies. But the cars ran, and excited their builders' dreams, challenging that type of inventive genius and individual enterprise that built our nation.

Today we look back on a kaleidoscopic scene of automotive

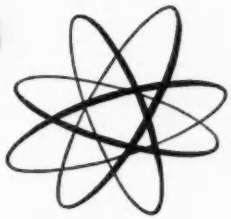
FEDERAL-MOGUL CORPORATION

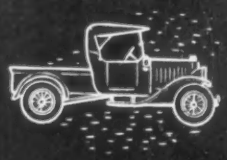
FIFTY YEARS OF CONTINUOUS

TO THE ATOM

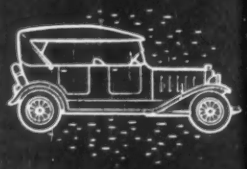
THE

INDUSTRY



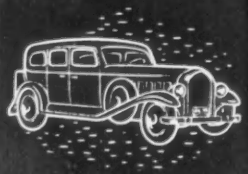


improvements and rapid changes spanning fifty years and two world wars. Always, the engine demands have been for more speed, more power, more agility, more durability. The development of engine bearings has kept pace with these demands and has frequently anticipated them.



Federal-Mogul Corporation now produces millions of precision engine bearings each month, in six modern manufacturing plants with over 2,800 employees, for many leading car, truck, bus, tractor, engine and other customers.

So, from the days of the anvil, and the hand-formed crankshaft to run on hand-fitted bearings, down to the present supercharged era of atomic power development, the record of Federal-Mogul is interesting, dynamic. It is a thrilling business narrative of America at work, in the best sense of freedom and enterprise—men, machines, and money all working to a common goal . . . the creation of better products, better values, and better service for better living for more people.



FEDERAL Mogul

DETROIT 13, MICHIGAN

BEARING EXPERIENCE

50 Years of Continuous Bearing Experience

WE SALUTE THE MEN
WHO MADE THIS RECORD POSSIBLE

The men who made the automotive industry are among the finest examples of the men who made America great. They were men of vision and courage . . . who risked much to gain much, and carried thousands of others along with them to unbelievable peaks of accomplishment and progress.

We are proud and grateful for the opportunity to have been associated with and a part of an industry that has done so much in so little time.

We are proud to remain a part of an industry that in its prime retains its dynamic character and drive.

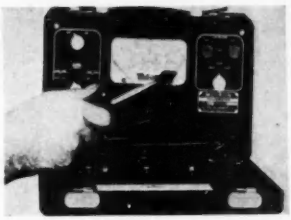
NEW PRODUCTS

For additional information please use coupon on page 54

(*Continued from page* 82)

for checking high speed universal motors or extreme low speed gear motors.

Any one of ten ranges is instantly selected by a rotary switch and no



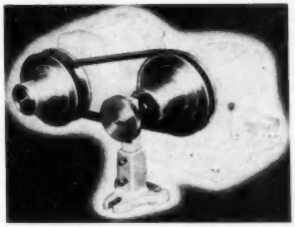
Metron tachometer for motor testing, type 48K

damage is said to result from overspeeding up to about 8000 rpm regardless of range setting. Readings are guaranteed accurate on all ranges to within ¼ per cent of actual speed, with high accuracy obtained by use of a bridge circuit principle.

C-145—Variable Speed Control

A one or two hp 6:1 ratio variable speed control using standard "B" belts, with fixed centers at any distance, is being manufactured by Speed Selector, Inc., Cleveland, Ohio.

The complete assembly includes two variable pitch sheaves and control. A spring-loaded sheave is mounted on the



Speed Selector 6:1 ratio variable speed control

motor shaft while the control sheave is mounted on the driven shaft. A regulating mechanism consisting of a hand wheel and bracket, adjustable to any application, opens and closes the control sheave. Changes in pitch dia cause the standard V-belt to actuate the spring-loaded motor sheave, giving

(*Turn to page* 88, *please*)

NEW PRODUCTS

For additional information please use coupon on page 54

stepless speed control over a 6:1 range. Remote control can be applied.

Any standard "B" section V-belt can be used. Sheaves are precision cast with hard ground shafts. Design features assure correct belt tension on fixed center distances, eliminating need for an adjustable motor base. Correct belt alignment is maintained at all speeds. Sheaves can be obtained separately for V-belt or flat pulley drives. Each variable pitch sheave has a 2.45:1 pitch variation, to give the total speed change ratio of 6:1. The full speed range is obtained by 8¾ turns of the control wheel.

The standard "B" section belt is replaced in a few seconds without removing other parts. Correct belt tension at all pitch diameters is maintained automatically by the tension spring in the spring-loaded sheave. Correct belt alignment is maintained at all speeds by the movement of the inner face of the spring-loaded sheave and the outer face of the adjustable sheave.

C-146—Inert-Arc Electrode Holder

Six new electrode holders for the Inert-Arc process, one for machine welding and five for manual welding, are being furnished by the Welding Divisions of General Electric Co., Schenectady, N. Y. The manual holders are available in 100-, 200-, 400-, and 800-amp ratings, and the holder for machine welding in ratings of 400 and 800 amps.

The new electrode holders for manual welding are a 100-amp air-cooled model with spring-type collets, metal nozzle, and gas-tight, heat-resistant gasket; 200- and 400-amp water-cooled models with split-copper collets, ceramic nozzles, and gas-tight, heat-resistant gaskets; a 400-amp model with integral water-cooled metal nozzle, furnished with tips of two orifice diameters; and an 800-amp model furnished with one electrode assembly for each size listed and with three water-cooled metal nozzles, one for 5/16- and ⅜-in. electrodes, one for 7/16-in. electrodes, and one for ½-in. electrodes.

For machine welding the new 400-amp water-cooled electrode holder comes furnished with one piece of each size of tungsten and one set of collets for each size. With this holder the electrode may be adjusted while welding,

General Electric inert-arc electrode holder in use fabricating a V joint

and both the electrode and collets may be changed without removing the nozzle.

The 800-amp water-cooled holder for machine welding is furnished with one electrode assembly and nozzle for each size of electrode.

C-147—Diamond Rotator Device

An automatic method of diamond rotation to obviate the cumbersome practice of unclamping the tool holder

(*Turn to page 92, please*)

Publications Available

(*Continued from page 54*)

company's bi-monthly bulletin for welding engineers contains articles in case history manner on typical and difficult problems of repair and construction, with photographs and full data, in fields of steel, cast iron, hard overlay, aluminum, etc.

A-184—Rotameters

Brooks Rotameter Co.—Bulletin No. 6, 4-page, describes the full-view rotameter with safety shielding. Contents include technical information, sales material, etc. The bulletin also describes several new rotameter forms.

A-185—Rivnut Pull-Tab

The B. F. Goodrich Co.—A new pull-tab demonstrator which shows the way its Rivnuts are installed is available. The pull-tab cites advantages of the Rivnuts for many purposes and explains how they work.

A-186—Precision Valves

Hanna Engineering Works—A new 16-page catalog, No. 251, on Hanna Precision Valves, includes illustrations, descriptions, specifications and features of the complete line of valves. Several new valves, recently designed by the company, are shown along with circuit diagrams.

A-187—Metal Turnings Crusher

American Pulverizer Co.—An information bulletin on crushing metal turnings is available. Illustrations and blueprints are included to show the specifications and construction of the economical Crushers.

A-188—Industrial Tractors

Le Roi Co.—Centaur industrial tractors are described and illustrated and detailed specifications given in a new CI tractor bulletin.

A-189—Micrometers

Swedish Gage Co. of America—A new catalog includes illustrations and sectional view drawings of the various types of micrometers. Prices, specifications and accessories are also listed.

A-190—Power Supply Units

The Motor Generator Corp.—A new 4-page, 2-color folder picturing and reviewing its line of aircraft ground auxiliary power supply units for hangar, ramp and apron service. Illustrated are both electric motor and gasoline engine driven units in a wide range of sizes. Also shown are self-propelled units that can be used for towing service in addition to ground power supply.

Studebaker Head Sees '49 Output Equalling That in '48

Although a drop of 10 per cent is anticipated "by most experts" in industry this year compared with 1948, Harold S. Vance, president of the Studebaker Corp., said in Hamilton, Canada, recently, that automobile production "probably won't be much different in overall volume" from 1948 figures. Mr. Vance and the board of directors and officers of the firm were in Hamilton to attend the first board meeting ever held outside the U. S. The Hamilton plant, which began operations last August, is now turning out six different models, including trucks, at the rate of eight units an hour. D. G. Gaskin, vice president of the Studebaker Corp. of Canada Ltd., said that he expected the work schedule "to taper off by summer with an average output of 1000 units a month."

GET BETTER PERFORMANCE AND CUT COSTS WITH INCO NICKEL ALLOYS

Next time you have a metal selection problem, consider this:

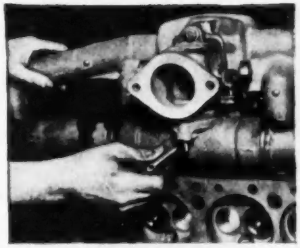
Many small-size forms of INCO Nickel Alloys are no more expensive than comparable ones of less effective metals—*and some forms are actually cheaper.* This is because of the ease with which ductile INCO Nickel Alloys are formed into wire, wire cloth, strip and small size tubing.

And that's only half the story.

You can drive your fabricating costs down too, because unit operations are fewer. You save all the expense of coatings and special finishes because these materials are solid, corrosion-resistant metals. Fewer anneals are necessary. And you will often need less metal because INCO Nickel Alloys are stronger than structural steels.

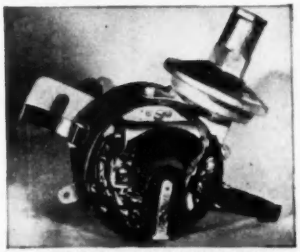
And think of the performance you get with INCO Nickel Alloys. These lustrous alloys are rustproof, tough and wear-resistant. They withstand extremes of temperature, and resist vibration fatigue and spark erosion.

Perhaps you have a metal problem right now. You can write us about it or call one of the distributors listed below. While you are at it, why don't you find out for yourself how surprisingly inexpensively you can get all the advantages of INCO Nickel Alloys in small diameter tubing, wire, wire cloth, small diameter rod, perforated metal and Su-veneer clad strip.



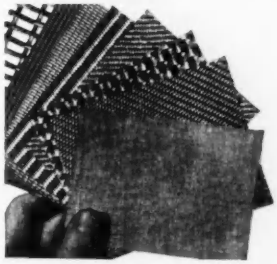
WITHSTANDS HEAT

Automotive choke tubes are made of Inconel for resistance to high heat and corrosion.



RESISTS SPARK-EROSION

Monel's resistance to spark erosion and corrosion increases performance of this distributor rotor.



PROVIDES STRENGTH

High strength of Inco Nickel Alloy wire screen and cloth provides resistance to stress and abrasion as well as corrosion.

INCO NICKEL ALLOYS ARE DISTRIBUTED BY:

Whitehead Metal Products Co., Inc.	Steel Sales Corporation
Williams and Company, Inc.	J. M. Tull Metal & Supply Co.
Pacific Metals Company, Ltd.	Metal Goods Corporation
Eagle Metals Company	

THE INTERNATIONAL NICKEL COMPANY, INC.

67 Wall Street, New York 5, N. Y.

EMBLEM OF SERVICE

NICKEL INCO ALLOYS MONEL* • "K" MONEL • "S" MONEL • "R" MONEL • "KR" MONEL • INCONEL* • NICKEL • "D" NICKEL • "Z" NICKEL

*Reg. U.S. Pat. Off.

NEW PRODUCTS

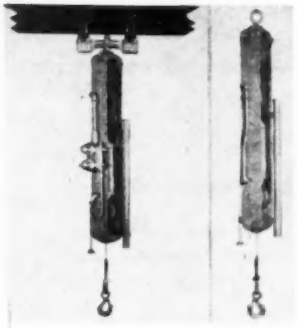
For additional information please use coupon on page 54

(*Continued from page* 88)

and turning the diamond by hand is a development of J. K. Smit & Sons, N. Y. This company's automatic "Dress-Ometer" diamond actuator operates by the compression of a plunger against the end guard of the grinding machine and rotates the diamond automatically 22½ deg on each complete pass across the wheel face, assuring effective cutting surfaces on 16 facets.

C-148—Adjustable Tool Balancers

For keeping production line tools in position for instant application, two tool balancers in a standard and an adjustable model are offered by the Platz Co., Detroit, Mich. The standard tool balancer model balances a tool left in any position in the balancing range without any up or down creep, yet the tool can be moved up or down with slightest pressure. The balancer hangs from a fixed point, or operates on a standard 4 or 6 in. I beam, Cleveland Tram-rail, or American Monorail. It swivels vertically from 0 deg to 17 deg and rotates 360 deg. It is equipped with a conduit tube to support the inlet hydraulic hose, or with an electric cable to the portable tool being balanced. A safety latch holds the balanced tool at the top of the balancing range when the production line is down for the day or when the air is shut off.



Platz adjustable tool balancer (left) and standard tool balancer (right)

Manufactured in balancing ranges of 36 and 42 in., balancing tools that weigh from 10 to 500 lb operate on 100 lb air line pressure. All balancers are built to balance a specific weight ±2½ lb to ±15 lb on larger models.

The adjustable weight tool balancer model is built for those who are undecided on type or weight of tool to use, or who desire to install interchangeable equipment to balance a range of weight. An adjustable pressure valve unit allows balancing any tool from 10 lb to a selected maximum wgt. Balancers are selected to the nearest standard maximum wgt, from 50 to 500 lb—in increments of 25 lb.

C-149—Diesel Lubricant

A diesel engine lubricant, designed to counteract the harmful effect of high sulfur fuels, has been developed by the D-A Lubricant Co., Inc., Indianapolis, Ind. D-A "extra-treated" diesel oil is an additive-type lubricant for high-speed diesel engines.

Owners of certain type diesel engines operating on diesel fuels with a sulfur content in excess of 0.5 per cent have been confronted with engine sludge resulting in stuck rings plus a high rate of liner wear. Use of D-A "extra-treated" diesel oil is said to eliminate these sludging and wear conditions. D-A engineers point out, however, that the new D-A "extra-treated" diesel oil is recommended only for use with high sulfur content diesel fuels.

CALENDAR

Conventions and Meetings

Phila. Auto Trade Assoc. Show, Phila. .....June 11-18

Nat'l Truck, Trailer & Equip. Show, Los Angeles .....June 15-18

ASME Conference Applied Mechanics, Ann Arbor .....June 13-15

American Inst. of Elec. Engineers, Swampscott, Mass. .....June 20-24

Amer. Soc. for Testing Materials Annual Mtg., Atlantic City..June 27-July 1

Amer. Electroplater's Soc. Annual Convention, Milwaukee.....June 27-30

SAE West Coast Mtg., Portland..Aug. 15-17

Conf. on Road & Motor Transportation, Geneva .....Aug. 23

Canadian Nat'l Aircraft Exhibition, Toronto .....Aug. 26-Sept. 10

Nat'l Air Races, Cleveland .....Sept. 3-4-5

Instrument Soc. of America Convention, St. Louis .....Sept. 12-16

Inst. of Traffic Engineers, Washington, D. C. .....Sept. 25-28

British Passenger Car Show, London, Sept. 28-Oct. 8

Society of Industrial Packaging and Materials Handling Engineers Annual Exposition, Detroit....Oct. 4-7

Paris Auto Show, Paris.....Oct. 6-16

Amer. Society for Metals Nat'l Metal Congress & Exhibition, Cleveland Ohio .....Oct. 17-21

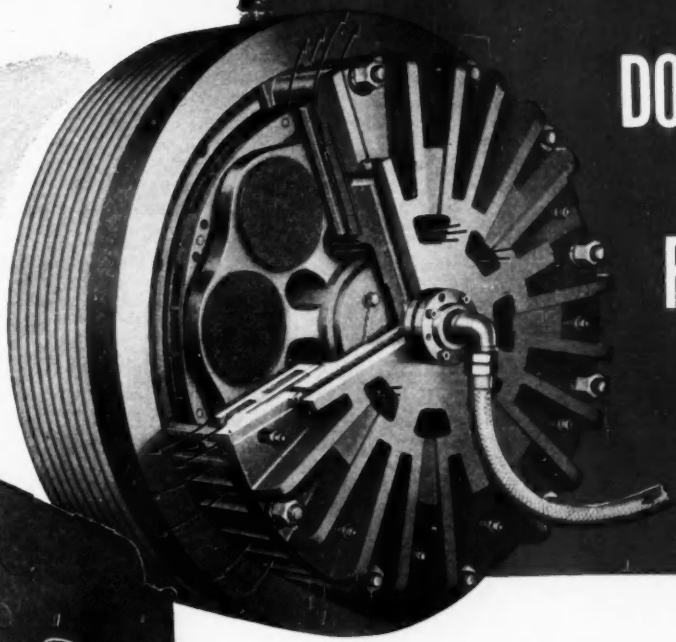
Nat'l Safety Council Safety Congress & Exhibit, Chicago .....Oct. 24-28

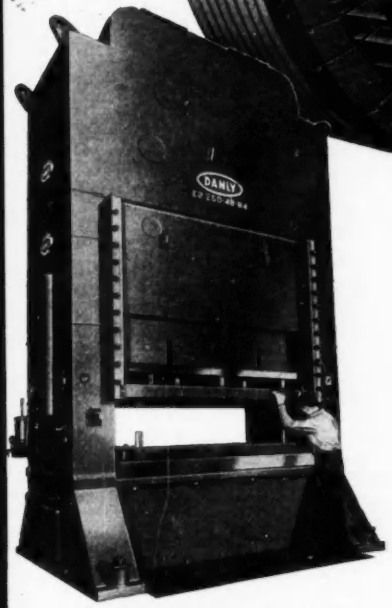
Amer. Society Body Engineers Annual Tech. Convention, Detroit Nov. 2-4

Chicago Auto Show, Chicago.....Nov. 4-12

A Big Reason Why

DOWN-TIME *is* REDUCED *with* DANLY PRESSES





New Exclusive Clutch Design Increases Production Efficiency

The complete line of Danly Mechanical Presses are engineered to reduce down-time and insure longer, uninterrupted operations. A new and entirely different type of friction clutch is used which eliminates the most common cause of clutch failures—excessive heat generation. This cool operation contributes to the long life of the friction disc and all non-metallic elements of the clutch.

Low Starting Torque Reduces Heat and Wear

Most of the components in the new Danly Press Clutch rotate continuously with the flywheel. With fewer elements subject to acceleration, starting torque and heat are substantially reduced. These advantages, plus the provision for rapid heat dissipation by forced air circulation, assure cool operation even under severe operating conditions. Cool operation greatly increases friction disc life resulting in less maintenance expense and less press down-time.

QUICK FACTS ABOUT DANLY PRESSES

Capacities: Sizes from 50 to 3,000 tons.

Types: Heavy-Duty Autofeed, Standard Autofeed, 1, 2, and 4-point Straight-Side, Double-Action and Gap Frame types.

Outstanding Features: Built-in automatic lubrication, extra heavy steel frames, extra long gibbing, built-in wiring and pre-tested electrical controls, and special engineering to suit your needs.

Write For *Free* Literature

Write for more facts today. Find out how the modern outstanding features of Danly Presses will help you increase output and lower your stamping costs.

DANLY MACHINE SPECIALTIES, INC.
2100 SOUTH 52nd AVENUE CHICAGO 50, ILLINOIS

DANLY

OVER 25 YEARS OF DEPENDABLE SERVICE TO THE STAMPING INDUSTRY

MECHANICAL PRESSES AND PRESS EQUIPMENT

General News

(*Continued from page* 60)

speed and is directly in front of the cylinder head. Electric starting and head lights are provided. The total weight of the tractor including plow and mowing attachment is 1650 lb. Fuel consumption is said to be between .45 and .5 gal per hr. The price in Germany is 4900.00 DM or $1300 at the official rate of exchange.

Senate Passes Legislation to Absorb Freight

The Senate last week passed legislation to legalize permanently freight absorption practiced in the absence of collusion. The bill is now being scheduled for debate in the House, where favorable action is a probability, but not a certainty. The upper chamber, acting with surprising speed, voted to lay aside the language of a bill (S. 1008) declaring a moratorium until July 1, 1950, on antitrust laws applying to pricing practices and passed by voice vote a substitute bill offered by Senator O'Mahoney, D., Wyo., which declares "nonconspiratorial" freight absorption permanently lawful.

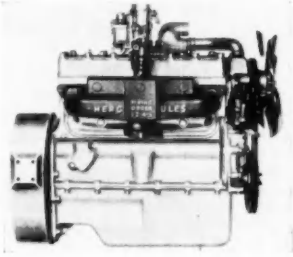
The bill encountered little opposition in the Senate. Two Republicans, Senators Langer, of North Dakota and Morse, of Oregon, denounced it as a measure designed to "tighten the strangle hold of monopoly upon a free-enterprise system in America." But a strong coalition of Democrats and Republicans forced passage of the bill on a voice vote.

Senator O'Mahoney told the Senate that enactment of the so-called moratorium bill sponsored by Senator Myers, D., Pa. would be "unwise" because it would amount to a "road block" against the investment of new capital during the period the moratorium would be in effect. "Such a situation would stop the development of industries in the West as well as in the East and in the South," he said. "It would bring about a condition which would prevail until 1950, until the Congress would again review the matter and decide whether freight absorption or delivered prices were to be condemned."

But Senator O'Mahoney defended the Federal Trade Commission's stand on the delivered price issue, claiming that the only purpose of his bill was to reaffirm the FTC's position that individual freight absorption has been legal all the time. Since the Supreme Court divided four to four on the issue of freight absorption in the rigid steel conduit industry, he declared that "the only possible relief that we could give was to speak clearly in Congress, stating what the FTC has said from the beginning; namely, that independent action without conspiracy is not prohibited."

Hercules Announces New Four-Cyl Engines

The Hercules Motors Corp. has added the following four-cyl gasoline engines to its line: model "JX4E," 3½ in. bore x 4¼ in. stroke, 164-cu in.; model



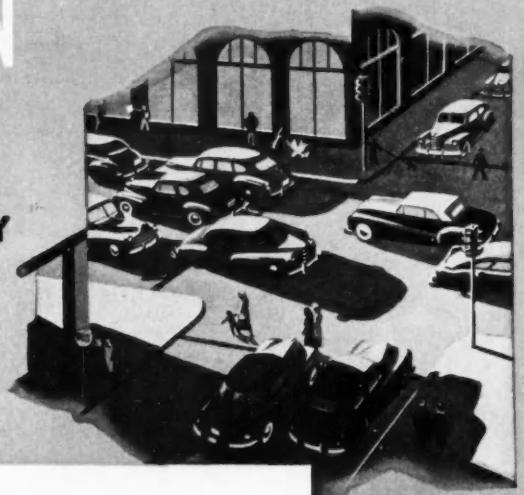
"JX4C," 3¾ in. bore x 4¼ in. stroke, 188-cu in.; and model "JX4D," 4 in. bore x 4¼ in. stroke, 214-cu in. They parallel in design the Hercules "JX" series of six-cyl engines.

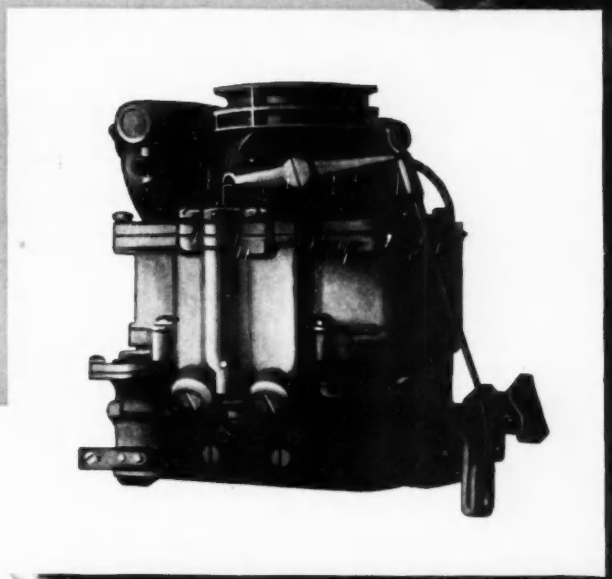
SPECIALIZATION

CARBURETORS—

AND CARBURETORS ONLY

FOR NEARLY 40 YEARS





You Can Depend on the Name

STROMBERG

REG. U.S. PAT. OFF.

for the finest carburetion

ECLIPSE-MACHINE DIVISION OF

- Standard Equipment Sales: Elmira, N. Y.
- Service Sales: South Bend, Ind.

Bendix

AVIATION CORPORATION

IN ACTION WITH THE HEAVYWEIGHT CHAMPS

To meet the needs of construction men and loggers, tractor manufacturers keep building bigger and bigger models. The largest tractors on the market today . . . giants that put plenty of wear and tear on brakes and clutches . . . use R/M friction materials as original equipment.

That's another example of R/M leadership in developing new friction materials to meet new industrial requirements. Through the years, R/M has led not only in developing new *sizes* of friction materials (from the largest to the smallest available) . . . but also in new formulas (dry process, semi-metallic, and flexible pulp, to name a few) . . . and in new *installation methods* (bonding, for example).

Whatever your problem in brakes or clutches, call in your R/M representative. He'll welcome the chance to help you. And he'll call, when needed, on the experience of four great plants, four research organizations, and four testing laboratories . . . assets that become yours when you deal with the world's largest producer of friction materials.

RAYBESTOS-MANHATTAN, INC.

EQUIPMENT SALES DIVISION **620 Fisher Bldg., Detroit 2, Mich.**

445 Lake Shore Drive, Chicago 11, Ill.
4651 Pacific Blvd., Los Angeles 11, Calif.
1071 Union Commerce Bldg., Cleveland 14, Ohio

Factories: Bridgeport, Conn. Manheim, Pa. Passaic, N.J. No. Charleston, S.C.

RAYBESTOS-MANHATTAN, INC., Manufacturers of Brake Linings • Brake Blocks • Clutch Facings Fan Belts • Radiator Hose • Mechanical Rubber Products • Rubber Covered Equipment • Packings Asbestos Textiles • Powdered Metal Products • Abrasive and Diamond Wheels • Bowling Balls

R M

FIRST IN FRICTION

AIRBRIEFS

(*Continued from page 52*)

weighed against the importance of the strategic decisions of the Joint Chiefs of Staff. Although the point has been much belabored, the experienced student will doubt the wisdom of such "single weapon" thinking. Neither the B-36 nor the 65,000-ton carrier could win a war and that is where the argument has become just plain silly. The real national danger in this controversy lies in the idle aircraft plants and deteriorating technical and production staffs that are being squandered in the effort. Contract cancellations during the 1949 fiscal year have cost the taxpayer more than $80 million already, but that is the smallest part of the loss. The real loss lies in the chaotic interruption of the program, frustration of management and technical staffs and dissipation of the encouraging momentum that was once again being evidenced by the industry. Not only does the airframe plant suffer but its thousands of subcontractors and supporting industries lose faith in the prospect of continuing business prospects in the field. The public, so far, knows only that the B-36 is in the news. It is to be fervently hoped that the public does not learn of the many, many errors in judgment and sheer erraticism in the current military aircraft procurement program that is at once the lifeblood of a vital industry and the salvation of the nation in any future emergency.

BOOKS ...

STANDARD WELDING TERMS AND THEIR DEFINITIONS, and STANDARD MASTER CHART OF WELDING PROCESSES AND PROCESS CHARTS. To formulate a suitable, standard terminology for welding the *American Welding Society* has just published the *Standard Welding Terms and Their Definitions*. This standard contains more than 500 terms and 57 illustrations. Its preparation involved defining many basic concepts and providing proper distinction between related concepts such as "fusion," "penetration" and "bond"; "bead weld" and "weld bead"; "backing weld" and "back weld," to cite a few.

An important aspect of the work involved in preparation of these standard terms was the necessity to verify that basic terms were equally applicable to all of the welding processes. The preparation of a *Master Chart of Welding Processes* listing all 37 welding processes in commercial use today and *Process Charts* comparing these processes on the basis of similarities and differences of 24 fundamental characteristics important in production welding proved very helpful. On the basis that these charts would be equally helpful to users of welding they have been issued concurrently with the Standard Welding Terms.

Copies of the *Standard Welding Terms and Their Definitions* may be obtained at $1.00 per copy, copies of the *Master Chart of Welding Processes and Process Charts* may be obtained at 35 cents per set of five ($1.25 for both if purchased together) from the American Welding Society, 33 W. 39th St., New York 18, N. Y.

RADIATORS SINCE 1903

CLUTCHES SINCE 1922

LONG

CLUTCHES • RADIATORS • OIL COOLERS

Japan's Industry

(*Continued from page* 25)

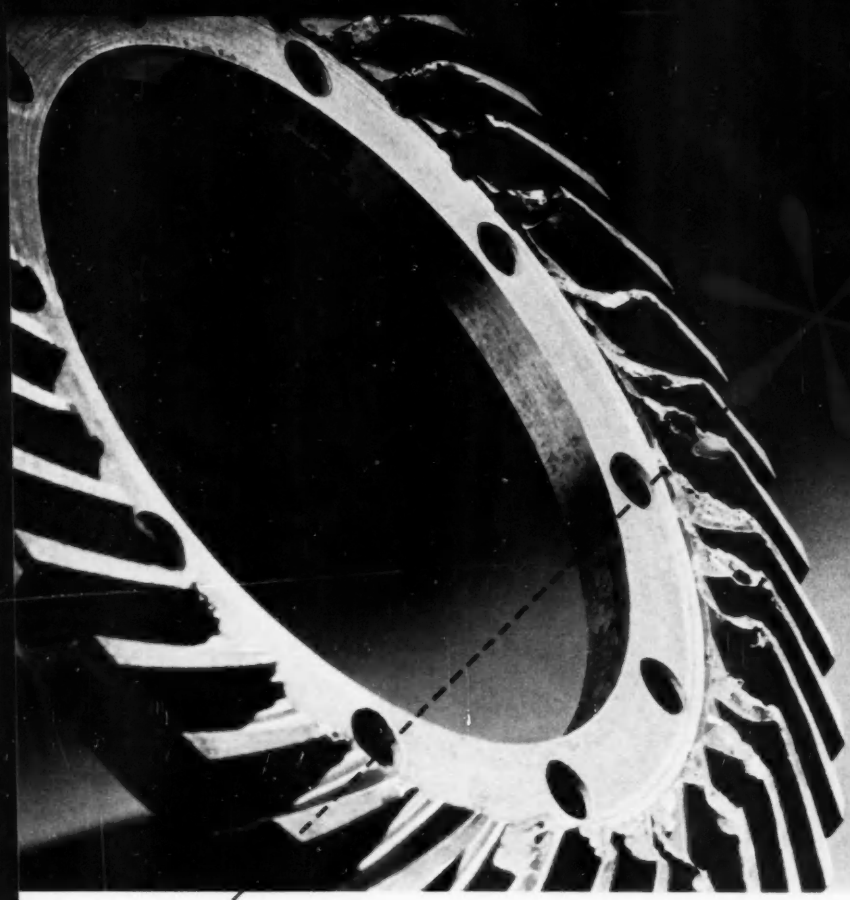
(cheaply imported) raw material is used. This is just about the antithesis of Japan's prewar trade economy, and is also the opposite of what General MacArthur's economic advisers think should be the basis of Japan's recovery.

It is estimated that under the new exchange rate of 360 per dollar, only such slightly processed goods as cotton yarn and piecegoods, steel rails and canned goods are competitive, while an exchange rate of 500 would be necessary to enable Japan to export crude chemicals, cameras and beads, a rate of 600 to find markets for bicycles, and a rate above that to compete in the international tire and automobile market. The high labor cost is, of course, due to the high cost of living, and not to any market improvement in real wages, and may therefore be expected to come down as the production of consumer goods catches up with demand. A further improvement may be expected when supply botlenecks, which now are holding back man-hour productivity, have been smoothed out.

Nevertheless, Japan will not be able to make a bid for world trade until the present manufacturing installations, which are more than ten years old, have been scrapped and the factories have been retooled on modern lines. Japanese makers fully realize the dangers inherent in the obsolescence of their plants. They are less worried about the prospect of not being able to sell to overseas markets than about the prospect of having to compete against imported American cars. Having regard to the Japanese balance of payments, the showdown appears a long way off. Ford and General Motors have so far not even bothered to restore their assembly plants because of the uncertain dollar outlook.

The Japanese automobile industry will, therefore, continue to enjoy the same sheltered existence to which it has been used since its inception. It will have plenty of time to contemplate the more distant future and to decide whether ultimately to team up with powerful foreign firms in order to make a determined bid for Far Eastern automotive markets, or whether to give up automobile production as a bad job.

Some indication of Japan's future position as an automobile exporter may be gleaned from a recent *New York Times* dispatch. Reportedly contracts have now been concluded for 6000 Nissan and Toyopet cars and trucks, most of which are headed for Formosa. At the end of last year, a contract was completed with Formosa for 5000 vehicles, while in March, Siam and the Philippines purchased 50 each, and in addition have signed for another 100 units each. Uruguay and Argentina are together purchasing 1000 buses.



The Inside Story of a Pinched Penny

THERE is no economy in a cheap gear. On the contrary, a pinched penny may purchase untold expense—plus headaches without number.

That is why we specialize in gears—"Double Diamonds"—that possess *true* economy. Economy expressed in terms of lowest *final cost*—including installation *and* performance.

It takes a little more time to make "Double Diamonds"—and considerably more experience, care and skill. But when they're done, we're proud of them. And because they contribute so substantially to the life, the performance, and the continued efficiency of your product, you'll be proud of them, too.

Manufacturers interested in gears that are built to show lowest final cost—who have an eye for long-run economy—are requested to write for information.

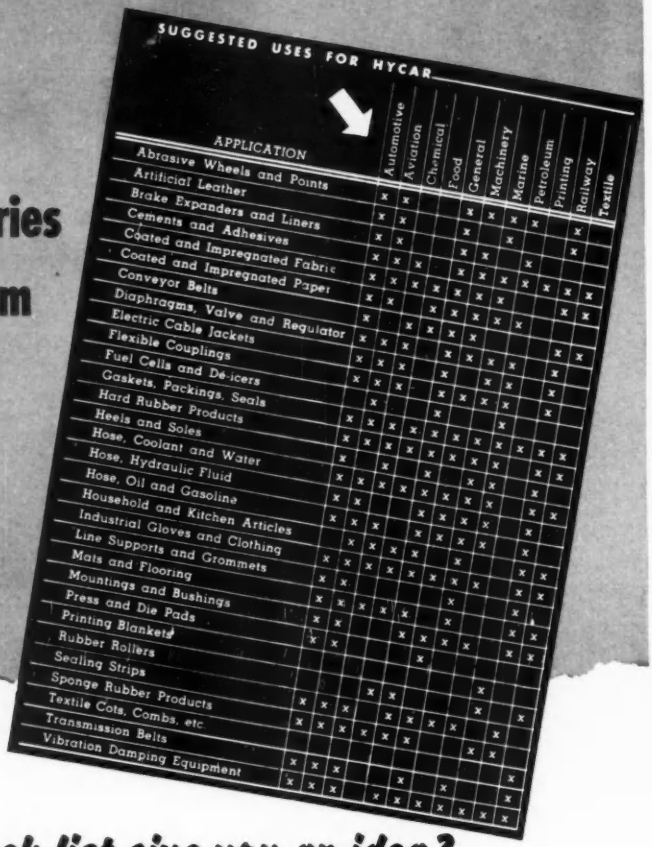
DOUBLE DIAMOND
TRADE MARK
GEARS

Made by
Automotive Gear Works, Inc.
RICHMOND, INDIANA

• • • • • FOR AUTOMOTIVE FARM EQUIPMENT AND GENERAL INDUSTRIAL APPLICATIONS • • • • •

*Reg. U.S. Pat. Off.

11 important industries that benefit from HYCAR



Does this quick check list give you an idea?

THAT chart lists 30 groups of items that can be made from Hycar American rubbers, and shows 11 broad industrial classifications where these Hycar parts can be used advantageously. The chart is taken from the up-to-date Hycar booklet, "Everywhere in Industry," which describes Hycar's characteristics with full technical data. A FREE copy is yours for the asking.

But at best the list is an incomplete one that can only suggest applications for Hycar in your own business. Hycar's usefulness is so wide and its versatility so great that scores and hundreds of important applications have not yet even been thought of!

That's why we suggest that you carefully examine the list of Hycar's inherent properties shown in the box at the right. Keep in mind the requirements of *your* rubber parts. And remember that it's possible to select exactly the right *combination* of properties to meet your established service conditions. Then—*ask your supplier for parts made from Hycar* for test in your own applications—difficult or routine.

You'll find that the use of Hycar parts will save you money—that it's wise to use Hycar for long-time dependable performance. For more information, please write Dept. HC-6, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

Hycar
Reg. U.S. Pat. Off.
American Rubber

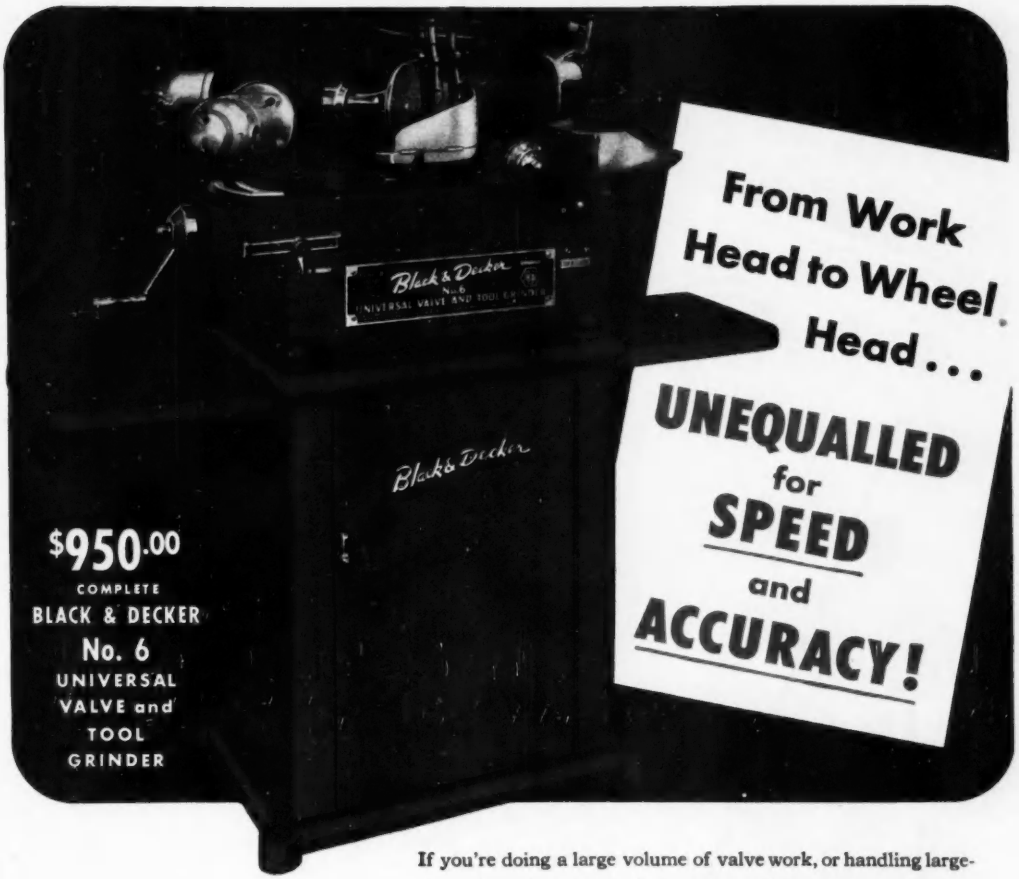
CHECK THESE SUPERIOR FEATURES OF HYCAR

1. **EXTREME OIL RESISTANCE**—insuring dimensional stability of parts.
2. **HIGH TEMPERATURE RESISTANCE**—up to 250° F. dry heat; up to 300° F. hot oil.
3. **ABRASION RESISTANCE**—50% greater than natural rubber.
4. **MINIMUM COLD FLOW**—even at elevated temperatures.
5. **LOW TEMPERATURE FLEXIBILITY**—down to −65° F.
6. **LIGHT WEIGHT**—15% to 25% lighter than many other synthetic rubbers.
7. **AGE RESISTANCE**—exceptionally resistant to checking or cracking from oxidation.
8. **HARDNESS RANGE**—compounds can be varied from extremely soft to bone hard.
9. **NON-ADHERENT TO METAL**—compounds will not adhere to metals even after prolonged contact under pressure. (Metal adhesions can be readily obtained when desired.)

B. F. Goodrich Chemical Company

A DIVISION OF THE B. F. GOODRICH COMPANY

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers



- *One machine* refaces valves of any angle from 0° to 90°; stem sizes from ¼" to 1¼"; head diameters up to 5¼".
- Hypoid gears of finest design and construction drive work-head spindle insuring very smooth spindle operation and mirror-finish valve faces.
- Air-operated chuck on work head for fast, accurate closing and opening of valve-stem collets.
- Separate universal motor drives work head; controlled speed accomodates large and small size valve heads; automatic motor switch controlled by table travel.
- The feed-screws on both work and wheel-head tables are precision ground, including threads, and bearing-mounted for fast, smooth travel. Wheel-head feed-screw calibrated in thousandths for close tolerance grinding.
- Separate ¾ H.P. constant speed motor assures abundant power for wheel-head spindle—drives 6" grinding wheel for refacing and cup wheel for valve stem, rocker arm and tappet grinding.
- Handy valve trays at operating height. Roomy cabinet has three shelves for storage of collets, wrenches, attachments, other hand or electric tools.

If you're doing a large volume of valve work, or handling large-size valves almost exclusively, or reconditioning a great variety of engine makes and sizes . . . this remarkable Black & Decker machine will pay you big dividends! In speedy, accurate performance and flexibility of range, the No. 6 Universal Valve and Tool Grinder sets a new high. Let your nearby Black & Decker Distributor demonstrate its many advanced features to you . . . the Hypoid Gear Drive, for example, which was selected only after long experimentation with all types of power transmission. So call your B & D Distributor today . . . or write for detailed booklet to: The Black & Decker Mfg. Co., 635 Pennsylvania Ave., Towson 4, Maryland.

LEADING DISTRIBUTORS EVERYWHERE SELL

Black & Decker

PORTABLE ELECTRIC TOOLS

Model 3-B-65 Auxiliary

Gear Splitters

FULLER'S NEW AUXILIARIES

For heavy grades and fast schedules . . . for heavy duty trucks in operations where plenty of gears are required, it's Fuller's new models 3-A-65 and 3-B-65 "gear splitter" auxiliaries.

For off-highway service, use Model 3-A-65 . . . splits unit transmission gears with its overdrive ratio . . . compounds low for heavy loads and tough going.

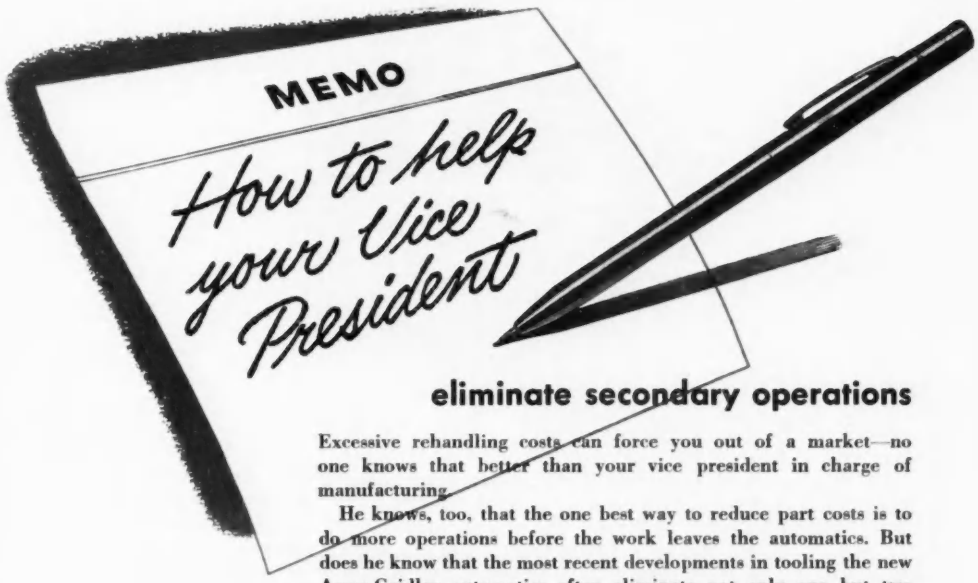
For highway work, use Model 3-B-65 . . . top speed in overdrive . . . overall reductions in low . . . more intermediate gear splits through either overdrive or low.

Fuller's gear splitters are designed for your job. Specify Fuller for replacement or on your new rigs.

FULLER MANUFACTURING COMPANY, TRANSMISSION DIVISION
KALAMAZOO 13F, MICHIGAN
Unit Drop Forge Division, Milwaukee 1, Wisconsin

WESTERN DISTRICT OFFICE (SALES & SERVICE—BOTH DIVISIONS)
1060 East 11th Street, Oakland 6, California

Fuller TRANSMISSIONS



eliminate secondary operations

Excessive rehandling costs can force you out of a market—no one knows that better than your vice president in charge of manufacturing.

He knows, too, that the one best way to reduce part costs is to do more operations before the work leaves the automatics. But does he know that the most recent developments in tooling the new Acme-Gridley automatics often eliminate not only one but two and three rehandlings?

A few pertinent case studies showing how other manufacturers have cut their piece costs substantially—by reducing handling time, machine overhead and floor space—may remind him what the new Acme-Gridleys can do for you. Here's a typical example; we'll gladly give you more. No obligation, of course.

CUT THIS OUT FOR USE WHEN YOUR VICE PRESIDENT WANTS PROOF

AN ACME-GRIDLEY CERTIFIED CASE STUDY

THIS IS WHAT HAPPENED:

PART TURNED—Bicycle Pedal Shaft

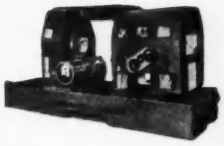
SIZE—¾" dia. x 4⅝"

MATERIAL—B-1112 Steel

MACHINE—1¼" RA 6 Spindle Acme-Gridley Bar Automatic

OPERATIONS—13, including shave large thread diameter, and roll thread, mill flats or large diameter, die cut thread and mill keyway on small end

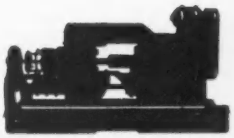
MACHINING TIME—15 seconds, complete



independently operated power-driven auxiliaries. Construction is strong throughout, from the heavily-ribbed pan to the rigid one-piece top brace. Gear-box and headstock are cross-walled, with reinforced shaft bosses. All fitted frame surfaces are ground, aligned, bolted and doweled, to form a sturdy, vibration-resisting foundation that permits accurate, high-speed operation.

AND HERE'S ONE IMPORTANT REASON:

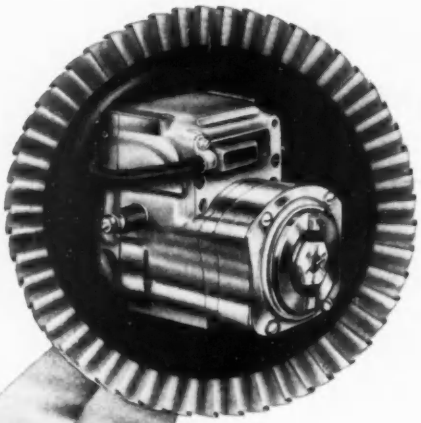
The rigid, box-type, balanced frame of an Acme-Gridley Automatic resists vibration, *holds* precision on heavy cuts, and provides ample room for many



THE NATIONAL ACME COMPANY

170 EAST 131st STREET • CLEVELAND 8, OHIO

ACME-GRIDLEY BAR and CHUCKING AUTOMATICS built in 4, 6 and 8-spindle styles, maintain accuracy at the highest spindle speeds and fastest feeds modern cutting tools can withstand.



Another First

for the BENDIX-SCINTILLA H TYPE MAGNETO

A Prime Factor in the New Bell Prime Mover

When Bell Aircraft Corporation gave the first really modern touch to the old-fashioned wheelbarrow, they made sure the ignition equipment was also the most modern by specifying a Bendix-Scintilla* H-Type Magneto. The performance of this magneto makes it the logical choice to meet the exacting requirements of this versatile Prime Mover.

For dependable, economical performance on the toughest jobs, you can't beat the Bendix-Scintilla H Magneto. To step up performance on your single cylinder engines, get full specifications on the Bendix-Scintilla H Magneto.

*TRADEMARK

OUTSTANDING FEATURES YOU'VE ASKED FOR

Waterproof coil • Waterproof, high-tension outlet Higher voltage at starting speeds • Constant spark over entire speed range • Equipped with impulse coupling Compact and sturdy construction.

Combining the functions and features of a giant wheelbarrow, a sturdy platform carrier, and a light scraper and grader, the new Bell Prime Mover has a capacity of 1000 pounds and an ability to climb 20% grades fully loaded.

SCINTILLA MAGNETO DIVISION of

BENDIX SCINTILLA

SIDNEY, NEW YORK

Bendix AVIATION CORPORATION

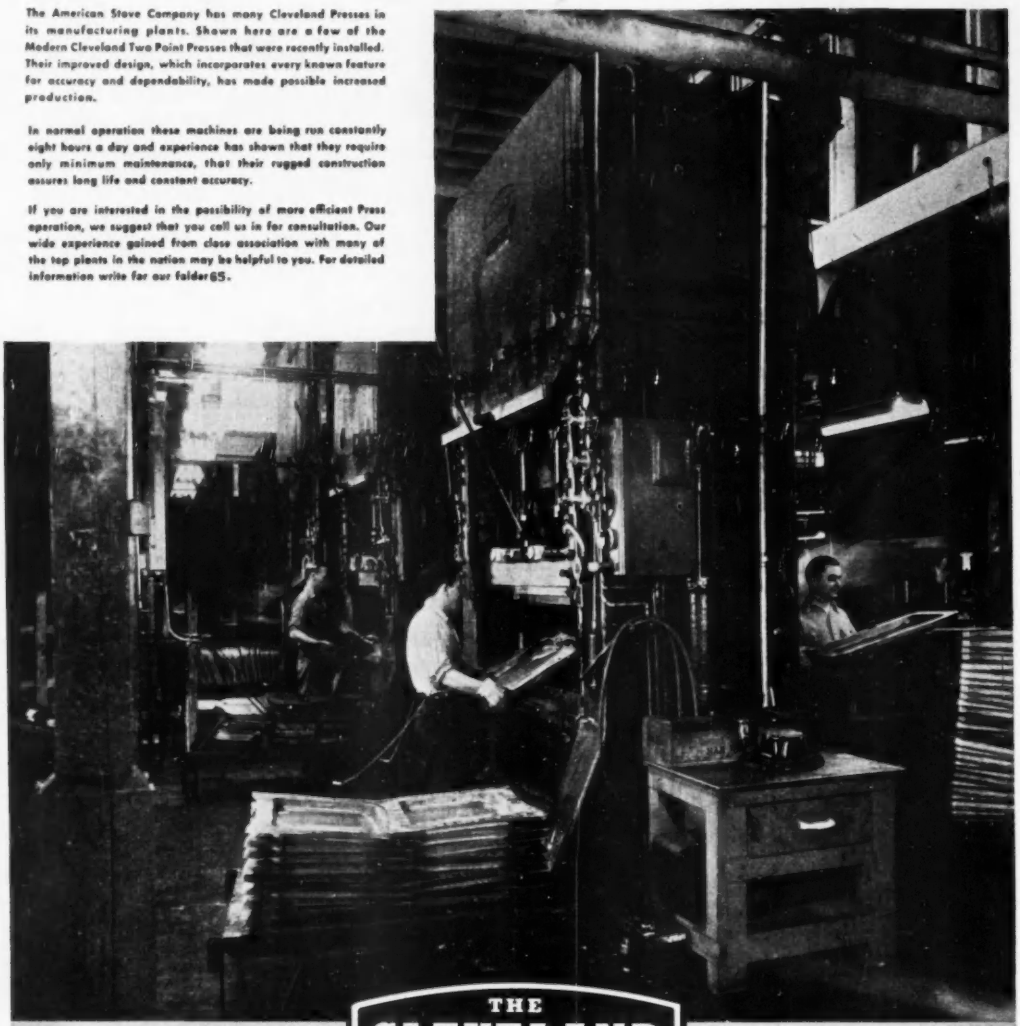
Export Sales: Bendix International Division, 72 Fifth Avenue, New York 11, N. Y.

INCREASED PRODUCTION WITH CLEVELAND'S

The American Stove Company has many Cleveland Presses in its manufacturing plants. Shown here are a few of the Modern Cleveland Two Point Presses that were recently installed. Their improved design, which incorporates every known feature for accuracy and dependability, has made possible increased production.

In normal operation these machines are being run constantly eight hours a day and experience has shown that they require only minimum maintenance, that their rugged construction assures long life and constant accuracy.

If you are interested in the possibility of more efficient Press operation, we suggest that you call us in for consultation. Our wide experience gained from close association with many of the top plants in the nation may be helpful to you. For detailed information write for our folder 65.



PUNCHING TOOLS & DIES

OFFICES AT:
NEW YORK....CHICAGO
DETROIT....PHILADELPHIA
PITTSBURGH

THE CLEVELAND PUNCH & SHEAR WORKS CO.
U.S.A.

Established 1880

• • • • • • POWER PRESSES • • • • • •

FABRICATING TOOLS

CLEVELAND 14, OHIO

SCHWITZER-CUMMINS SUPERCHARGERS

POSITIVE DISPLACEMENT
...Sizes to Supercharge Engines 50 H.P. to 500 H.P. Rating — Pressure Ratios 2 to 1 Maximum.

- OIL PUMPS
- WATER PUMPS
- COOLING FANS
- SUPERCHARGERS
- VIBRATION DAMPENERS
- AUTOMATIC SHAFT SEALS

THIRTY YEARS of intensive work on the varied problems related to the development and manufacture of superchargers for all types of internal combustion engines has developed here at Schwitzer-Cummins Company a unique ability to select the best in type of equipment and the "know how" to apply it for the utmost in compactness, efficiency and reliability. Final unit production cost is our prime consideration at all times.

We shall appreciate the opportunity to study your supercharger requirements, either for a new engine design or to improve present performance. We can place at your disposal qualified technical experience and knowledge of proven and latest developments in this field. Our long service to the industry embraces the designing and building of superchargers and their drives for marine and stationary engines—for buses, trucks and locomotives—for earth movers, power generators, pumping, hoisting, and construction equipment and many specialized uses—gasoline and Diesel, two cycle and four cycle, large and small.

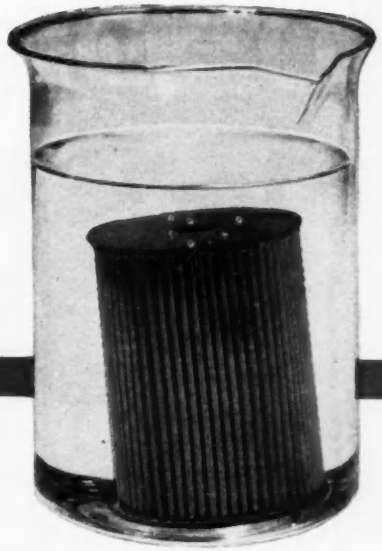
Illustrated here is an unusual combination of supercharger and water pump for a six cylinder, two cycle Diesel with automotive engine type bearings, pressure lubricated from engine oil pump.

Whatever your requirement or application, we feel we have something for it. May we serve your needs?

ALL IMPORTANT PARTS
are manufactured in our own plants under direction of our supercharger engineers for full interchangeability and the utmost simplicity on service requirements.

More power and improved performance from your engine with compactness, simplicity and low cost. Manufactured to our design or to suit requirements peculiar to your own.

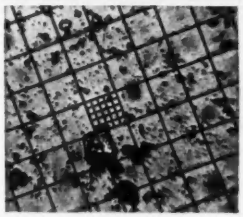
SCHWITZER-CUMMINS COMPANY
1125 MASSACHUSETTS AVENUE • INDIANAPOLIS 7, INDIANA, U.S.A.



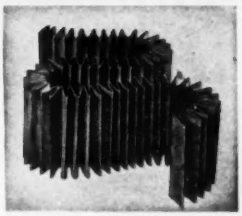
Typical Purolator Micronic Oil Filter element undergoing immersion test which proves its exceptional resistance to water.

Tests like this **prove...**
PUROLATOR *can't* warp, distort, disintegrate!

HERE'S WHY PUROLATOR FILTERS COMPLETELY!



Filters Micronic Particles. In Government tests on oil filters, with approved Test Dust containing graded dust ranging from one micron on up, Purolator's *specially designed Micronic element* filtered 97.8% on the very first pass-through.



5 Times Greater Filtering Area. The revolutionary accordion-pleated design of the Purolator Micronic Filter provides an area 5 times that of old-style filters. This means a far greater dirt-holding capacity . . a much longer filter life.

PUROLATOR
MICRONIC OIL FILTER
"FIRST IN THE FIELD OF FILTERING"

Put a Purolator Micronic Oil Filter element in a jar of water . . . let it stand for as long as 300 hours . . . *it will not warp, distort, or disintegrate!*

This is an extremely important Purolator advantage, since the oil in the average crankcase is frequently diluted with as much as *10%* water. And as little as *5%* water dilution causes many ordinary elements to swell up and practically shut off the oil-flow through the filter within three short hours.

Most important, Purolator assures *complete* filtration. For the Purolator Micronic Oil Filter removes 290% more abrasives because it filters *micronic* particles . . . has a filtering surface 5 times that of old-style filters . . . does not permit channeling or unloading. Yet—while it *removes* all the sludge, all the abrasives—a Purolator *leaves* in the oil any additives placed there for greater lubrication efficiency.

Consult our highly experienced engineering staff about your specific filtering problem. And be sure to write for additional data and technical information on the Purolator Micronic Oil Filter.

PUROLATOR PRODUCTS INC.
Newark 2, New Jersey, and Windsor, Ontario, Canada

CECO-DROP

The Chambersburg CECO-DROP is a new piston-lift, gravity-drop hammer in which the ram is lifted by air or steam rather than by friction operated boards. There are fewer operating parts, shock-absorbing mechanisms are employed, lubrication is automatic and operation is simple and safe. In shop after shop, over the past few years, the CECO-DROP has amply proved that it can forge more minutes per hour, make more forgings with fewer blows, costs less to operate and is safer and easier on the hammerman.

Write for Bulletin 11-L-9

CHAMBERSBURG SINCE 1897

CHAMBERSBURG ENGINEERING CO. **CHAMBERSBURG IMPACT** CHAMBERSBURG, PENNA.

Be smart about your business . . . demand uniforms of

REEVES QUALITY FABRICS

Beyond compare for smart good looks and longer wear, Reeves Fabrics have what it takes to stand up under the punishment of repeated launderings . . . and still look fresh and crisp. For these Reeves Fabrics are made from carefully selected long-staple cotton . . . combed . . . Sanforized* . . . and vat-dyed in colors that are fast to sun, water and perspiration.

You benefit three ways. Smart looking uniforms boost employee morale... increase customer good will. Longer-wearing uniforms mean greater savings because they spread first costs.

Look for the Reeves Fabric Label—it's your sign of uniforms and work clothes that "mean business." Write today for complete information concerning your industry.

*Residual shrinkage less than 1%

"FROM COTTON TO CUTTER"

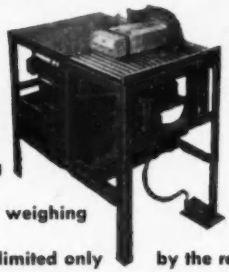
REEVES BROTHERS, INC.

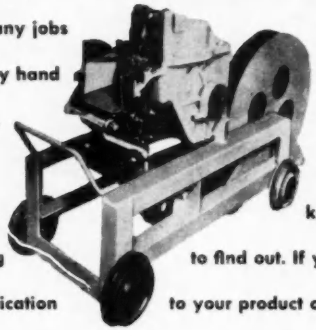
54 WORTH STREET, NEW YORK 13, N. Y.

REPRESENTATIVES IN: *Akron • Atlanta • Boston • Chicago • Dallas • Los Angeles • Philadelphia • Portland, Oregon • St. Louis • Montreal • Toronto*

AN OPEN LETTER TO MANUFACTURERS WHO ARE TAKING A NEW LOOK AT COSTS!

■ Design engineers of Signode Steel Strapping Company have developed a new, high speed production tool—the Signode Power Strapping Machine.® This new tool, because it may be adapted to assembly operations as well as volume packaging, opens up a whole new area of profit possibilities for mass producers.® With a minimum of manual assistance and control, it drapes, tensions and seals steel strapping around all kinds of objects . . . from a wire coil weighing hundreds of pounds to a radiator hose . . . at speeds limited only by the rapidity with which these objects can be fed.® It is automatic or partially automatic, depending on the nature of the operation; and the tension which it applies to the strap is adjustable to fit the needs of your product. ® Already many jobs that used to be performed slowly and expensively by hand . . . in the rubber, automotive, steel and other industries . . . are now being handled on a conveyor line basis, faster, better and at lower cost with this machine.® Even we don't know its full potential; but we'll bet it doesn't take American industry long to find out. If you are a manufacturer who can envision its profitable application to your product or process . . . in any step of production from initial assembly through shipping . . . you are invited to write for further information.





SIGNODE

®

SIGNODE STEEL STRAPPING COMPANY
2610 N. Western Ave. • Chicago 47, Ill.

BLAZING A TRAIL TO BETTER SHIPPING *THROUGH RESEARCH*

• Here is an unretouched photograph of a ¼ in. thick, compression-molded plate fabricated by Plax Corporation from BAKELITE Styrene BMS4-A1. Note its unblemished, crystal-clear transparency.

You're Looking at the CLEAREST Styrene Plastic Available!

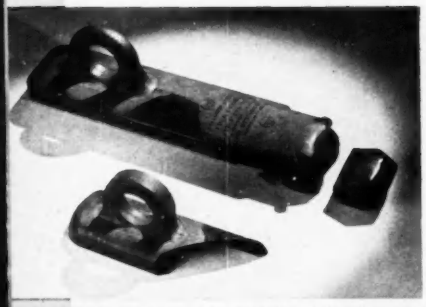
❶ You have much to gain by investigating *general-purpose* BAKELITE Styrene Plastics, which provide among the polystyrenes available today:

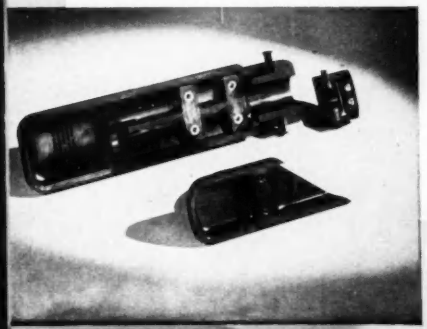
- **Greatest clarity and brilliance.**
- **Maximum cleanliness, at topmost requirement for whites, pastels, and colors.**
- **Ready availability as standard materials at standard low costs.**

These general-purpose Styrene Plastics come in two types. The *BMS4 group* offers the utmost in clarity, but needs higher heat applied to both material and mold to facilitate flow. The *BMS6 group* is specially processed to provide easier flow and excellent mold release at customary temperatures. Common to both groups are moldability to fine detail and lustrous finish, with strong acid- and alkali-resistance and excellent electrical insulating properties.

BAKELITE NEWS NO. 6

NOTES FROM BAKELITE CORPORATION ON BETTER, FASTER, LOWER COST PRODUCTION WITH "BAKELITE" PLASTICS

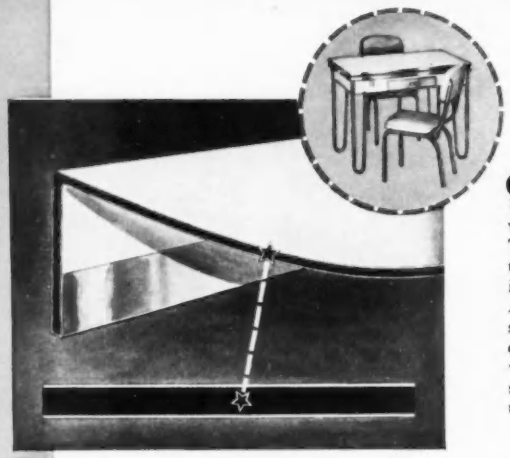




SIXTEEN YEAR Durability Test!

❷ The durability of BAKELITE Phenolic Molded Plastics has long been recognized as one of their chief attributes. Dramatic evidence of this durability was recently presented by the Line Material Company, manufacturers of fuse cutouts for power lines. These cutouts are fitted with doors or covers molded from BAKELITE Phenolic Plastics. The Line Material Company placed them on their roof test rack for exposure against the elements in highly corrosive atmosphere. The smaller cover illustrated has been exposed for 16½ years, the larger cover for more than 10 years. Both covers were sawed apart for examination of the interior construction. There was no deterioration. Although the surfaces had been dulled by the many years of weathering, the original lustrous finish was easily restored by buffing, as can be noted by the polished areas.

MORE BAKELITE NEWS ON NEXT PAGE



❶ Cutaway of a section of the ⅛" thick "Lloydite" table top, the heart of which is paper core stock impregnated with BAKELITE Phenolic Laminating Plastic.

It's What You Don't See That's ALL IMPORTANT!

❸ "Lloydite" table tops are plastic laminate all the way through, ⅛ in. thick, heat- and compression-molded in one operation, during which the "waterfall" edges and corners are formed and trimmed. They resist cigarette burns, alcohol, fruit acids, boiling water, and the many other hazards of the kitchen. BAKELITE Phenolic Laminating Varnishes are employed for impregnation of their core stock. Although unseen, the presence of these varnishes in the laminated structure is all important. They impart high tensile, flexural, and compressive strengths; low water absorption; corrosion resistance; wear and abrasion resistance, and lightness in weight. The ease and speed with which these phenolic varnishes are employed in treating the core stock makes for low cost production.

Is YOUR FOUNDRY Taking Advantage of RESIN Sand-Core BONDING?

Dielectric baking of res bonded cores for railw journal-box covers at rate of two a minute. Photo courtesy Inducti Heating Corporation.

❹ Noteworthy advantages have already come from casting iron, steel, brass, bronze, aluminum, and magnesium . . . with the help of BAKELITE Phenolic and Urea liquid and powder resins as binders for the sand cores. Some of these advantages are: shorter core baking cycles than with non-resin binders, more uniform high quality of cores, improved collapsibility of cores, minimum moisture pickup permitting longer storage of sand cores to match the needs of production lines, and smoother surface finish that reduces the cost of cleaning castings. Sand cores made with these resins are suitable for either oven or high frequency dielectric baking.

A BIG Idea for Giant-Sized LAMINATES!

❺ These giant-sized pasting boards—used by the tanning industry—are "Consoweld" plastic laminated panels made with BAKELITE Phenolic Laminating Resins. They are produced in sizes up to 5 ft. 7 in. by 12 ft. 9 in. by ¼ in.—even larger on special order—by Consolidated Water Power and Paper Company. Besides being lastingly smooth, the boards are light in weight and resistant to mechanical shock, chemicals, and moisture. They have excellent machineability, and stability through the temperature fluctuations of the tanning operation. Do they suggest a *big* application for you?

Bakelite

TRADE-MARK

PLASTICS

BAKELITE CORPORATION

Unit of Union Carbide and Carbon Corporation UCC

30 East 42nd Street, New York 17, N.Y.

Design Changes Are Easy with Versatile, Adaptable Plastics!

Check coupon below for information on specific subjects illustrated. For general information, write for copy of Booklet G-8, "A Simplified Guide to BAKELITE and VINYLITE Plastics."

BAKELITE CORPORATION, Dept. A-22
30 East 42nd Street, New York 17, N. Y.

Please send information on subjects checked below:

- ☐ 1. BAKELITE Styrene Plastics
- ☐ 2. BAKELITE Phenolic Plastics
- ☐ 3. Phenolic Laminating Plastics for Table Tops
- ☐ 4. Resin Binders for Sand Cores
- ☐ 5. Phenolic Laminating Plastics for Large Panels

Your Name ..... Title .....

Your Company .....

Address ..... City ..... Zone ..... State .....

Seattle, Wash.—Kenworth Motor Truck Corporation build four models of modern, lightweight bus bodies using Mayari R cold-formed structural shapes. All four are designed so that 90 pct of their framing can be made with only five different shapes.

ACROSS the NATION

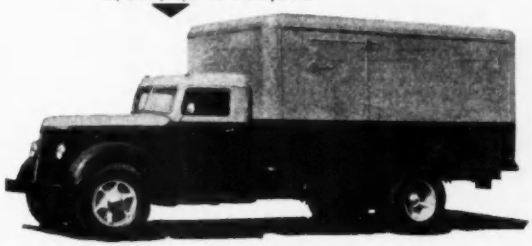
VEHICLE BUILDERS ARE CUTTING DEADWEIGHT WITH MAYARI R

Perry, N. Y.—Kaustine Company built this 6000-gal frameless truck tank from Mayari R. The shell, baffles and heads are welded into a high-strength unit capable of carrying full loads without ordinary structural members.

Rock Hill, S. C.—Rock Hill Body Company build commercial truck bodies like the beverage truck body shown at left. They use Mayari R because it allows substantial weight reduction without sacrificing strength. They have also found that paint lasts longer on this grade of steel than on ordinary carbon steel.

Detroit, Mich.—Oltman-O'Neill Company build lightweight truck bodies from Parish Universal Body Sections of Mayari R steel. These strong yet light-gage members have high resistance to impact, fatigue and atmospheric corrosion, thanks to the superior properties of Mayari R.

Mayari R is a versatile grade of low-alloy, high-strength steel that is being used to advantage by truck and bus body builders in all sections of the nation. For further information on its uses write for a copy of the new Mayari R catalog.



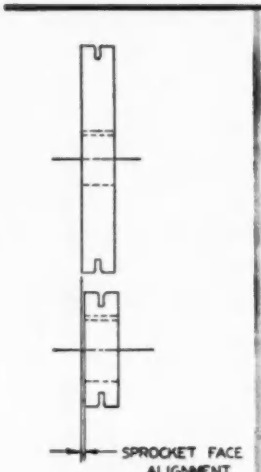
BETHLEHEM STEEL

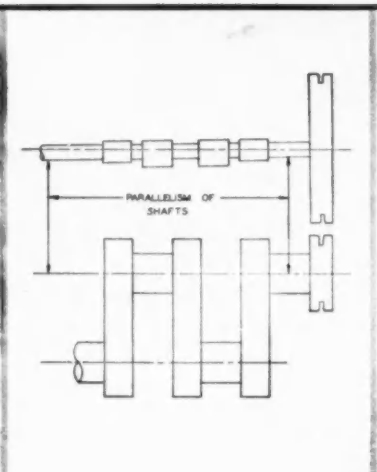
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

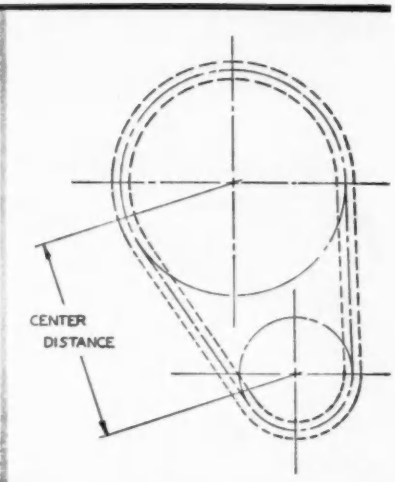
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

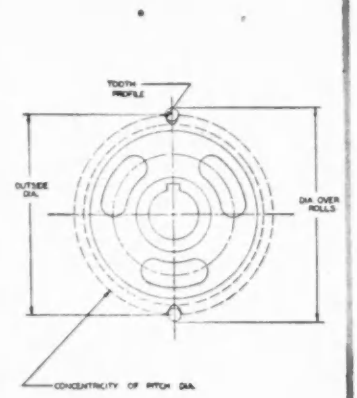
Mayari R *makes it lighter... stronger... longer lasting*

Morse timing drives give you design and manufacturing freedom









FOR any given timing drive, Morse Timing Chains and Sprockets give you complete freedom in designing, manufacturing, assembly, and performance.

For instance, end play of the shafts is not so critical when you use Morse Timing Chain Drives, nor does such movement affect the timing. Correct and positive timing is still maintained.

Even though camshafts and crankshafts are not perfectly parallel, Morse Timing Chain Drives give safe, sure and quiet performance.

With Morse Timing Chain Drives the center distance of the drive is allowed a greater tolerance. This in turn permits larger tolerances on the engine block and permits economical production.

With greater manufacturing tolerances permissible on the sprockets, Morse Chain engineers can furnish a complete drive produced under the most favorable and economical conditions.

Call in Morse engineers early in the design of your new engines. Give them the opportunity of making suggestions which will save you time and money, and insure the perfect performance you require. Morse Chain Co., 7601 Central Avenue, Detroit 8, Mich.


Roller Chain Drives


Morse-Rockford Friction Clutches


Silent Chain Drives

MORSE

MECHANICAL
POWER TRANSMISSION
PRODUCTS

A PRODUCT OF BW BORG-WARNER


Morse-Formsprag Over-Running Clutches

MORSE CHAIN COMPANY • DETROIT 8, MICHIGAN

Double Production *with* GARDNER *Double* GRINDING!

WORK DATA	
Part	*Heat Transfer Unit*
Material	*Cast Iron*
Operation	*Grind Two Sides*
Tolerances	*.010" for Parallelism; .010" for Squareness; 1/32" for Uniformity*
Stock Removal	*1/32" Maximum Per End*
Production	*20 to 30 Pieces Per Hour*
Feed	*Hand Feed and Unload to Special Fixture Mounted on Hydraulic Sliding Table*
Machine	*#120A-30" Gardner Double Grinder*

BY grinding TWO surfaces with ONE pass, many of your parts can be parallel-surfaced twice as fast — and costs can be *cut right in half!* In some cases, by using special fixtures, for hard-to-handle units, production can be *more than doubled.* The cast-iron heat transfer unit shown here, is one example out of hundreds. Learn how GARDNER *Double* GRINDING will boost your rate of production on parallel-surfacing jobs — while lowering your per-unit cost.

Use Modern GARDNER WIRE-LOKT Abrasives on YOUR Disc Grinders!

Write for Our *Double* GRINDING Bulletin!

GARDNER-GRIND YOUR *Flat* SURFACES

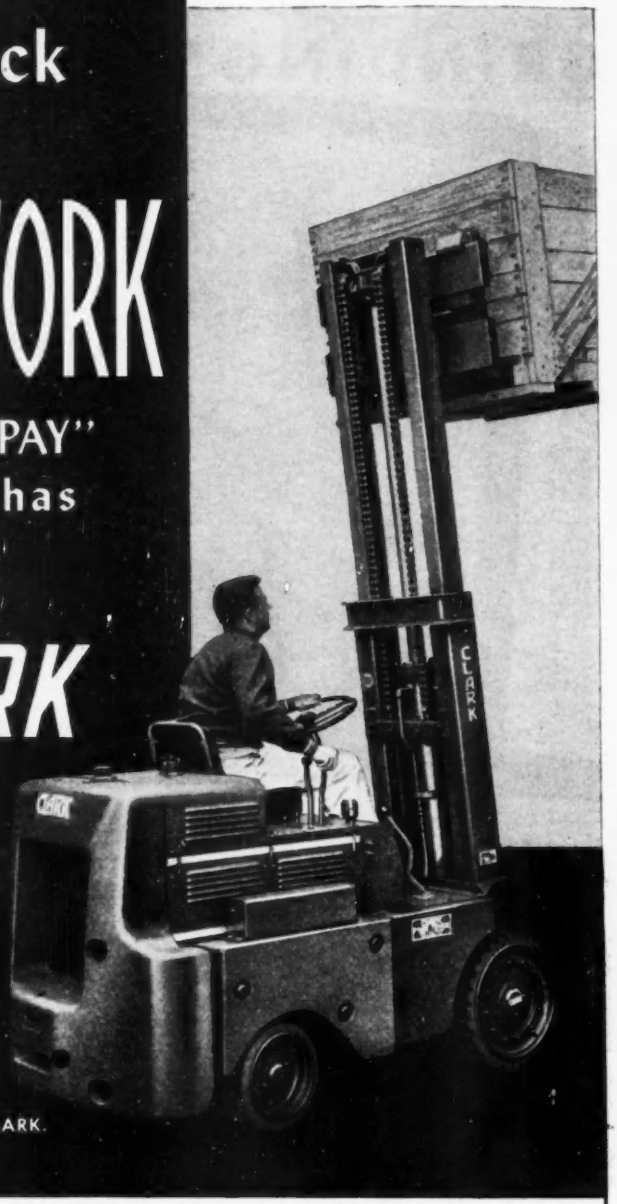
GARDNER MACHINE COMPANY

444 East Gardner Street . . . . Beloit, Wisconsin, U.S.A.

This Fork Truck DOES MORE WORK

FOR LESS "PAY"
because it has

DYNA-TORK Drive



Available *only* in CLARK'S gasoline-powered Utilitruc, DYNATORK DRIVE eliminates the clutch and conventional transmission. Nothing comparable in the fork-lift-truck field. Benefits so numerous that the important question is: CAN YOU AFFORD TO BE WITHOUT IT?

To help get the answer—to enjoy unsurpassed counsel on any materials-handling matters—CONSULT CLARK. Please direct inquiries on your business letterhead to address listed below.

INDUSTRIAL TRUCK DIVISION
CLARK EQUIPMENT COMPANY
BATTLE CREEK 85, MICHIGAN

AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS

NATIONAL OIL SEAL LOGBOOK

USE OF DUAL-WIPE "SYNTECH" OIL SEALS

Modern precision machines operate at speeds and temperatures once thought impossible. But the gears and bearings of these "lickety-split" mechanisms still need oil seals to guard against loss of lubricants or damage from external abrasives. Doing this job effectively and safely often requires oil seals as new and specialized as the machines themselves.

Typical of new oil seals developed to meet this challenge are the National 10,000S (Fig. 1) and National 30,000S series (Fig. 2). The 10,000S series is designed for moderate external dust conditions, speeds to 3600 FPM, and temperatures not over 300°F. The 30,000S series is for heavier abrasive conditions, speeds to 2500 FPM, and temperatures not over 300°F.

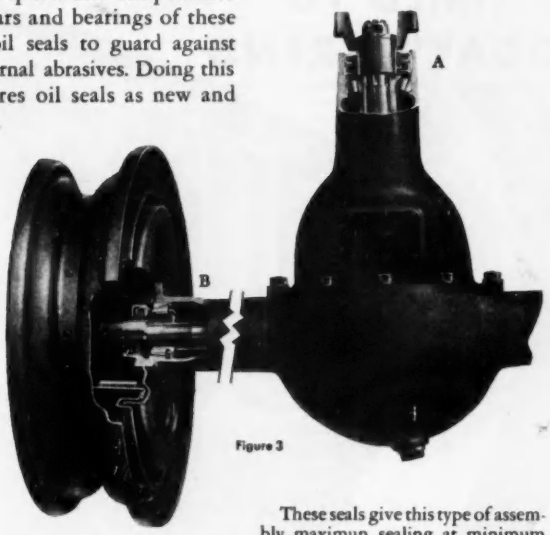


Figure 3

Both types of seals are used on high speed rear axle and pinion assemblies of modern automobiles and light trucks; on engine crankshafts, power fans, large electric motors and gear boxes of all kinds.

At the pinion "A" in Fig. 3, a National 10,000S seal is used. Its felt outer auxiliary member guards against light dust at the pinion, and can run "dry" at high speeds without injury. The spring-loaded main member, of compounded synthetic rubber, has minimum torque yet retains a pressure head of lubricant with zero leakage.

At the wheel position, "B" in Fig. 3, a National 30,000S seal is used. Here speeds do not exceed 800 R.P.M., but absolute "zero leakage" is desired and external abrasives are a constant hazard. This seal employs an accurately spring-loaded synthetic-rubber sealing member to retain bearing lubricant. The outer seal is a rugged leather flange which effectively excludes concentrated dust and dirt.

These seals give this type of assembly maximun sealing at minimum torque—the final goal in every use of the dual seal. Other seal types are available which will solve many specific problems. However, when one or more conditions are unusually extreme, a special seal design may be required.

For more information, contact the National Oil Seal Engineer nearest you or write direct.


Figure 1


Figure 2

NATIONAL OIL AND FLUID SEALS

NATIONAL MOTOR BEARING CO., INC.

General Offices: Redwood City, California
Plants: Redwood City and Los Angeles, California; Van Wert, Ohio

CALL IN A NATIONAL ENGINEER FOR RECOMMENDATIONS

BUFFALO: 56 Arlington Place, Grant 2280.
CHICAGO: Room 2014 Field Building, Central 6-8663.
CLEVELAND: 210 Heights Rockefeller Bldg., Yellowstone 2720.
DALLAS: 301½ Highland Park Village, Justin 8-8453.
DETROIT: Room 1026 Fisher Building, Trinity 1-6363.
HOUSTON: 6731 Harrisburg Boulevard, Wayside 3-1246.
LOS ANGELES: 2244 East 37th Street, Kimball 6384.
MILWAUKEE: 647 West Virginia St., Marquette 8-8986.
NEW YORK CITY: 122 East 42nd Street, Lexington 2-8260.
PHILADELPHIA: 401 North Broad Street, Bell-Walnut 2-6997.
REDWOOD CITY, CALIF.: Broadway and National, Emerson 6-3861.
WEST SPRINGFIELD, MASS.: 1025 Elm Street, Springfield 2-1881.
EAST SYRACUSE, N. Y.: 226 Roby Avenue, East Syracuse 366.
WICHITA: 340 North St. Francis Ave., Wichita 2-6971.

Reprints from this or other Logbook pages are available for your files. Request them from our Redwood City, California, office

TIMED TO TODAY'S TREND

Redmond 1/10th HP DC MICROMOTOR

UP TO 1/3rd HP ON INTERMITTENT DUTY

It's in line with the latest trend in the automotive industry toward larger heating, ventilating and defrosting units. It's ideal for electro-mechanical and electro-hydraulic devices.

Scientifically chamfered field pole design, cushion mounted armatures and pre-seated brushes provide smooth, quiet operation. Large oil reservoirs and direct feed lubrication assure long life. Self-centering bearings are individually fitted to the shaft, and a strong steel case protects the mechanism and maintains alignment.

Here you get tested efficiency and long life, a product backed by the reputation of millions of lower power Redmond direct current Micromotors that have given years of top performance under rugged conditions all over the world.

Write for full information today.

Redmond COMPANY, INC.

OWOSSO, MICHIGAN

Expanded Facilities • Prompt Deliveries • Service before and beyond the sale

REDMOND

We're Strangers...

to some of our Best Friends!

Standard Products Company? Sure, many know us only as the world's largest manufacturer of glass-run window channel and weatherstripping (STEECHAN). Meet the rest of the Standard Products "family":

- **Automobile door locks, checks and remote controls (Reid Products Division, Cleveland).**
- **Fine molded thermo-plastics parts (St. Clair, Michigan).**
- **Dependable extruded or molded rubber parts (Port Clinton, Ohio).**
- **Canadian manufacturers of *Steechan products* (Backstay-Standard, Ltd., Windsor, Ont.).**

In any Standard Product, you can be sure of CAREFUL ENGINEERING, QUALITY PRODUCTION and DEPENDABLE SUPPLY.

THE MARK OF A SUPERIOR PRODUCT

The Standard Products Co.

EXECUTIVE OFFICES – 2130 W. 110th ST. CLEVELAND 2, OHIO

SALES OFFICES – 316 FISHER BLDG., DETROIT 2, MICH.

Address inquiries to: Plastics Division, 4670 Puttygut Rd., St. Clair, Mich.

HOW'S THE bright-work ON YOUR POSTWAR MODELS STANDING UP?

CONSIDERING the fact that the oldest of the "new" cars is only about four years old, this may seem like a foolish question. But don't think that it's not important.

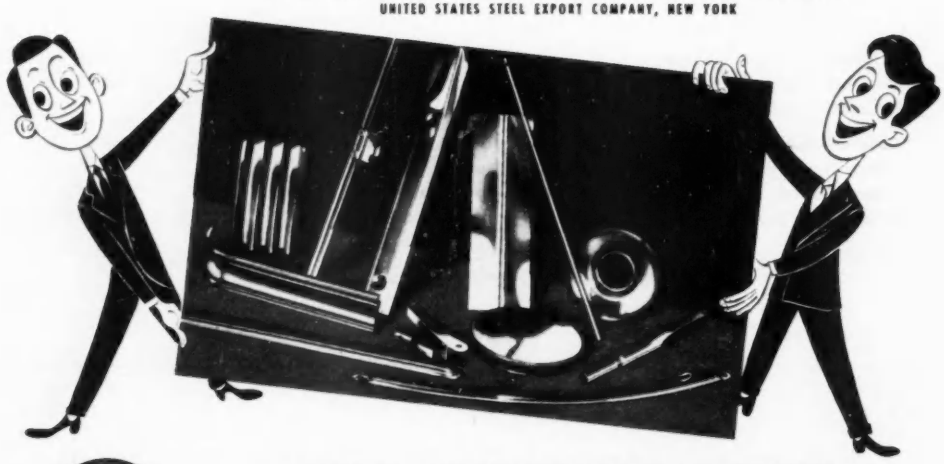
We've been in quite a few garages and service stations lately and they tell us that a lot of drivers who were mighty proud that they'd finally beaten the car shortage were all burned up at the way their fine new cars were getting dingy around the edges. Already the plated bright-work was dull and rusty or peeling off. And to say the least, they didn't like it—especially at today's car prices.

But—where Stainless Steel was used for bright-work, the story was different. Decorative parts and trim still had that salesroom sparkle because Stainless, with ordinary care, can be kept looking like new and there's no plating to peel off. Every owner was a booster, for with Stainless Steel to safeguard the beauty of his car he felt that nothing had been spared to give him full value for his money. And that's the kind of car user you can count on for future sales.

Remember, U·S·S Stainless Steel adds more than lasting good looks—it adds lasting good will. What's more it does *not* add materially to the cost. Its exceptional ductility makes forming easy. It can be used in very thin sections. It requires no plating. Thus, lower *production* costs materially reduce any price differential between U·S·S Stainless and less efficient, plated materials.

If you want practical, experienced help in applying U·S·S Stainless Steel most economically, get in touch with our engineers.

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
CARNEGIE-ILLINOIS STEEL CORPORATION, PITTSBURGH & CHICAGO
COLUMBIA STEEL COMPANY, SAN FRANCISCO · NATIONAL TUBE COMPANY, PITTSBURGH
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK



USS

U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

9-319

UNITED STATES STEEL

The CRANKSHAFT is probably the most important single part in the modern high-speed, high-compression, internal-combustion engine.

Wyman-Gordon—specialists in the design and forging of crankshafts since the start of the automotive industry—furnished the first heat-treated crankshaft, forged the first six-throw crankshaft, forged the first eight-throw crankshaft, forged the first crankshaft with integral counterweights. In automotive crankshafts and in all types of aircraft forgings, steel and light alloy, there is no substitute for Wyman-Gordon experience.

Standard of the Industry for More Than Sixty Years

WYMAN-GORDON

Forgings of Aluminum, Magnesium, Steel

WORCESTER, MASSACHUSETTS, U. S. A.

HARVEY, ILLINOIS - - - DETROIT, MICHIGAN

To make

AUTOMOTIVE INDUSTRIES

even more useful to you

we offer . . .

The AUTOMOTIVE INDUSTRIES Editorial Index covering all issues from January 1, 1949, to June 15, 1949, Inclusive

The 20-page AUTOMOTIVE INDUSTRIES Editorial Index, to be issued July 10th, saves hours of searching for specific subjects covered in past editions, and comes in 8½"x11" size for easy filing.

It provides you with a quick summary of ALL the editorial articles, listed alphabetically by subject, along with page numbers and dates of the issues in which they appear. Also includes a cross-index by author and company mentioned.

Printing of the index will be limited, so order your copy now by enclosing check or cash for 50 cents, with the coupon below. If, at the same time, you wish to order the index for the next 6-months' issues (July 1 to December 15, inclusive), enclose $1.00. It will be sent upon publication.

Mail coupon today to Editorial Department

AUTOMOTIVE INDUSTRIES

Chestnut & 56th Sts.

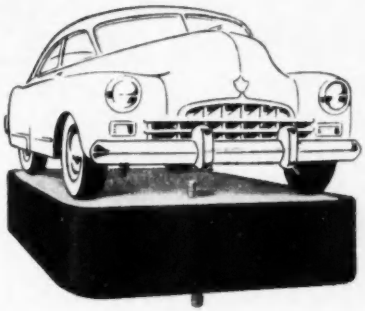
Philadelphia 39, Pa.

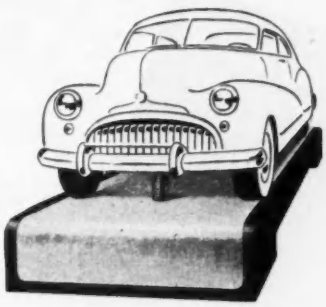
Please send me the new AUTOMOTIVE INDUSTRIES Editorial Index covering the 12 issues from January 1 to June 15, 1949, inclusive, for which I enclose 50¢. (I would also like to order the next 6 months' index, both for $1.00, which I enclose). Forward index to:

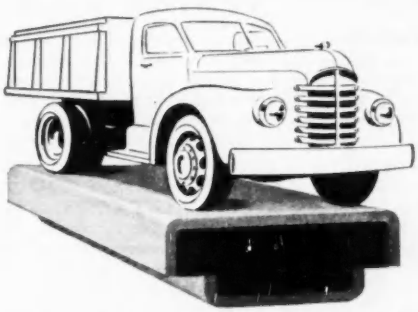
Company .....

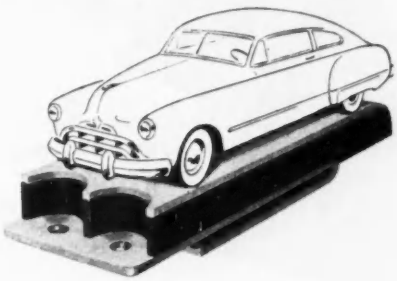
Street .....

City ..... State .....



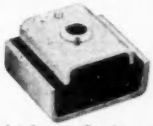




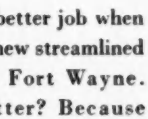


True! Rubber-to-Metal parts, strategically placed, help make today's cars run more silently and smoothly

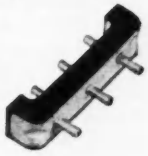
BUT—these sandwiches do a better job when made by U. S. Rubber in the new streamlined plant at Fort Wayne. Why better? Because "U. S." employs the "Brass-o-matic" process, which results in a permanent bond—and which is exclusive with "U. S."



Not only that, but "U. S." engineers will work closely with you to make sure the design, the rubber compounding, and the bonding of rubber to metal all result in the precisely engineered rubber product you require.



Just call or write United States Rubber Company—Engineered Rubber Products Division—Fort Wayne, Indiana, or 5850 Cass Avenue, Detroit.



ENGINEERED RUBBER PRODUCTS FOR THE AUTOMOTIVE INDUSTRY

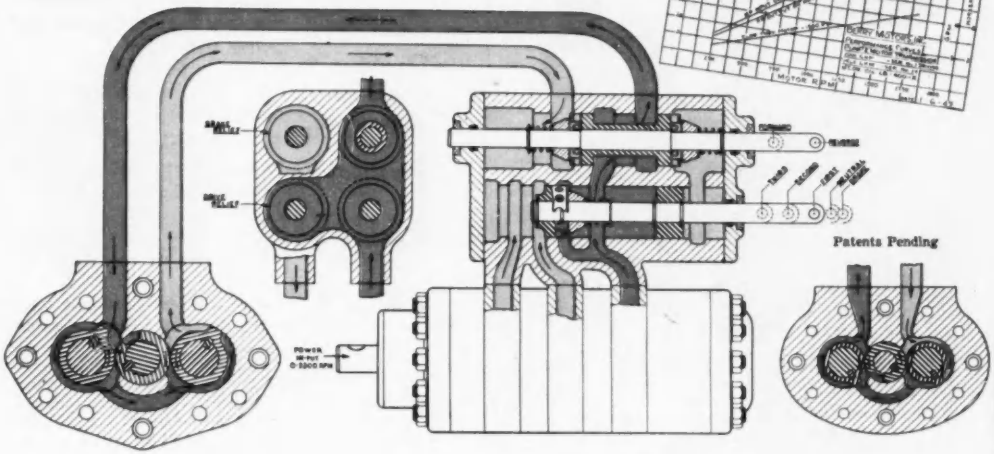
MADE AT FORT WAYNE BY

U.S.RUBBER

SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

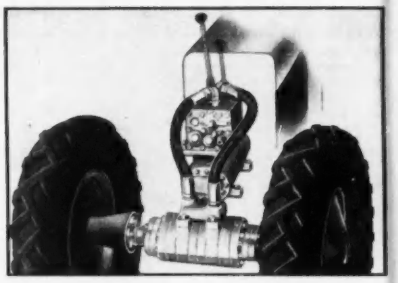
DON'T SLUG IT!



Patents Pending

SQUEEZE IT... with BERRY

VARIABLE SPEED HYDRAULIC TRANSMISSION



360°
OF SMOOTH-POSITIVE HYDRAULIC POWER

PRESSURES FROM 0-5000 PSI

The Berry High Pressure Hydraulic Transmission, constructed on the unique principle of a rotary piston, delivers 360° spiral flow of smooth, pulsationless, positive power. Simple construction makes possible exceptionally low initial cost. The complete elimination of frictional contact between the operating parts and their mating surfaces, assures dependable performance — low upkeep — long life. The superiority of the Berry principle brings to industry a degree of efficiency and economy never before obtained in the use of hydraulic transmissions.

LET US SOLVE Your Problem

SPECIAL SERVICE:

The Berry Engineering Staff will be glad to make a comprehensive study of your particular hydraulic power transmission needs, and suggest their solution through specific adaptations of the Berry principle. No obligation, of course.

- *Fully Reversible*
- *Unit Controls*
- *Closed System*
- *Low Weight per H.P.*
- *Flexibility on Speeds*
- *High Torque Efficiencies*
- *Noiseless*
- *Cool Operation*
- *Adaptable*

BERRY MOTORS INC.
ROTARY POWER
PNEUMATIC AND HYDRAULIC *Equipment* MANUFACTURERS
CORINTH, MISSISSIPPI

MAIL TODAY!

BERRY MOTORS, INC. **Dept. A**
Corinth, Mississippi

Please send information on ☐ Pumps, ☐ Motors, ☐ Variable Transmission.

Name .....
Title .....
Company .....
Business Address .....
City ..... Zone ..... State .....

FOR BUS, TRUCK, AND TRACTOR APPLICATIONS

GENERAL CONTROLS

hi-g* VALVES

PV-1

Normally closed shut-off valve of the electro-magnetic type—various magnet sizes—full ported or restricted ports—for all types of fluid, gasoline, air, water, oils, etc.

PV-9

Pilot Piston valve for medium and high pressure applications. Normally open and normally closed types. Controls hydraulic oils, fuels, lubricating oils, water, etc. 50 to 3000 P.S.I. operating pressure.

PV-16

Electric motor valve, suitable for fuel, hydraulic fluid and lubricating oil shut-off. High flows at low pressure drop, explosion-proof motor and switch cover.

PV-11

Three-way Electro-Magnetic valve used for distribution of fluid flow or for "feed in" and "exhausting" fluid from a cylinder, piston or vessel.

PV-7

Four-way selector type control-operating pressure up to 3000 P.S.I. for control of fluid pressure operated cylinders.

PV-2

Same as PV-1 except is normally open type. For control of various fluids, oil, water, gasoline, air, etc.

GENERAL CONTROLS

Manufacturers of Automatic Pressure, Temperature and Flow Controls.

FACTORY BRANCHES: BIRMINGHAM (3), BOSTON (16), CHICAGO (5), CLEVELAND (15), DALLAS (2), DENVER (10), DETROIT (8), GLENDALE (1), HOUSTON (2), KANSAS CITY (2), NEW YORK (17), PHILADELPHIA (40), PITTSBURGH (22), SAN FRANCISCO (7), SEATTLE (1). DISTRIBUTORS IN PRINCIPAL CITIES.

METAL PROTECTING CHEMICALS — ACP PROCESSES — SURFACE TREATING CHEMICALS

"Deoxidine"® —removes rust, oil, grease and other surface soil.

"Duridine"®
"Granodine"®
"Lithoform"® —provide a lasting paint bond and a durably finished surface.

"Peroline"® —prevents rust during storage and transit.

"Rodine"® —inhibits pickling acids and improves pickling operations.

"Alodine"® —protects aluminum surfaces from corrosion and forms a durable paint bond.

Don't let unprotected metal or a poor paint bond spoil your finished product. Write or call us (Ambler 0486) for full information on your metal-working problem; and the chemicals listed above.

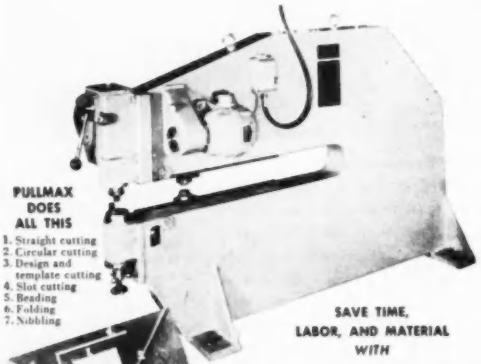
Pioneering Research and Development Since 1914

AMERICAN CHEMICAL PAINT CO.

AMBLER, PA.

Manufacturers of Metallurgical, Agricultural & Pharmaceutical Chemicals

---



PULLMAX DOES ALL THIS
1. Straight cutting
2. Circular cutting
3. Design and template cutting
4. Slot cutting
5. Beading
6. Folding
7. Nibbling

SAVE TIME, LABOR, AND MATERIAL WITH

PULLMAX

(PATENTED)

PLATE AND SHEET CUTTING MACHINES

Pullmax Machines do straight cutting, circular cutting, figure and design cutting, beading, and folding on mild or stainless steel, aluminum, magnesium, copper, brass and other metals from fine gauge up to 3/8" thickness.

Made by Haldex Co., Sweden

FOR INFORMATION WRITE:

PULLMAX COMPANY

2627 N. WESTERN AVENUE, CHICAGO 47, ILLINOIS

STANDARD PRACTICE...

MARSH STENCIL MARKING

FOR STENCIL MARKING SHIPMENTS

Users save $50 a month with Marsh Stencil Machines, Brushes, Inks. Electric and Hand Operated machines cut ½", ¾", 1" letters. For sample stencil, Shippers' Handbook, prices, pin this to business letterhead with your name.

MARSH STENCIL MACHINE CO.
41 Marsh Bldg. • Belleville, Ill., U.S.A.

Herbrand SINCE 1881

PRECISION

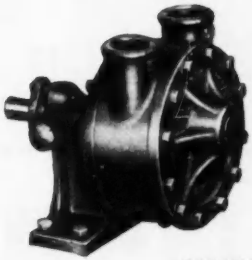
DROP FORGINGS

...any size or shape up to 200 lbs.

Herbrand DIVISION

THE BINGHAM-HERBRAND CORPORATION, FREMONT, OHIO

designed for carefree performance...



That's why it pays to specify TUTHILL

GENERAL PURPOSE PUMPS

• Low first cost • Negligible maintenance • Compact design • Operates dependably in either direction of rotation • Capacities to 200 g.p.m. • Pressures to 100 p.s.i. • Direct drive, slow-speed V-belt units and stripped models

Write for Model C bulletin.

TUTHILL PUMP COMPANY
939 East 95th Street . Chicago 19, Illinois . Phone RE 4-7420

Individually Tested... TO INSURE BETTER PERFORMANCE!

IMPROVED SPRING CLAMP

"C" CLAMPS

HAND SCREW

QUICK CLAMPS

NO. 640 IMPROVED "I" BAR CLAMP

HARGRAVE

Hargrave Clamps have been constantly improved with the aid of skilled mechanics to offer greater operating advantages and increased durability. Individually Tested, they must be stronger, tougher and flaw-free. Made in openings from ¾ in. to 10 ft., from ½ in. to 16 in. deep.

WRITE FOR CATALOG

showing the complete line of Hargrave Individually Tested Clamps, Chisels, Punches, Brace Wrenches, Star Drills, Washer Cutters, File Cleaners, etc.

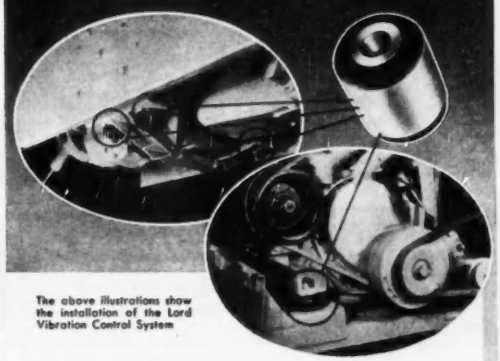
THE CINCINNATI TOOL COMPANY
4056 Montgomery Road
Cincinnati 12, Ohio

THERE IS AN INDUSTRIAL DISTRIBUTOR STOCK NEAR YOU

HARGRAVE Tested Tools
THE CINCINNATI TOOL COMPANY

a LORD VIBRATION CONTROL SYSTEM

Promotes Passenger Comfort
Protects Engine and Bus
in the
FLXIBLE CLIPPER 29B1



The above illustrations show the installation of the Lord Vibration Control System

The same Lord Vibration Control System that gives the passengers greater comfort and pleasure also protects the power plant against road shocks, isolates engine vibration from frame and body, reduces repairs and prolongs bus life, builds goodwill for the bus company and the bus manufacturer.

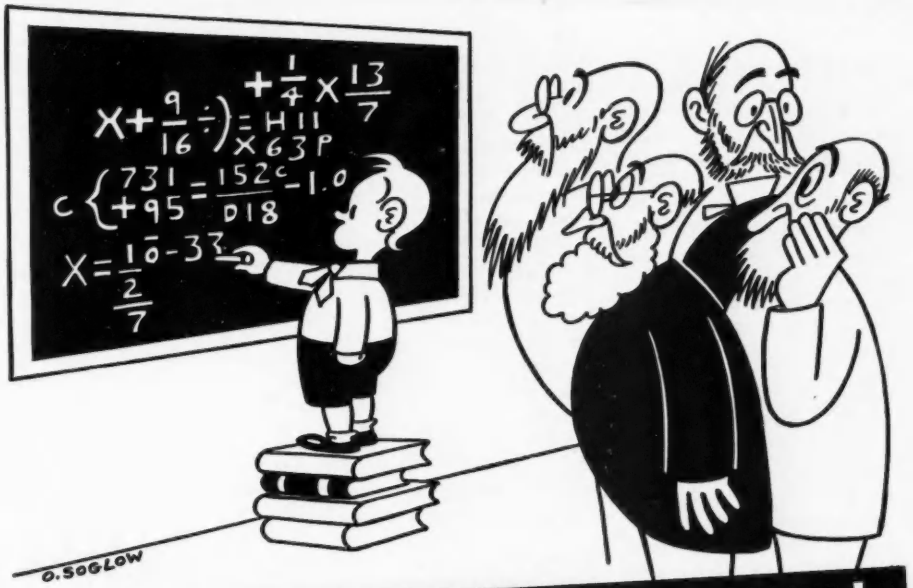
Flxible accomplishes all this by the use of six Lord Vertical Snubbing Tube Form Mountings; two dual units at the transmission and clutch end, and two single units at the fan end of the engine.

This is another illustration of the extreme importance of vibration control, and of the low first cost and long-time economy of a Lord Engineered Vibration Control System. Whether your product is as large as a bus or as small as a dial gauge, its life can be lengthened and the quality of its service improved by a Lord Vibration Control System.

See our Bulletin in Sweet's 1949 File for Product Designers or write for Bulletin 900 today. It describes the complete line of Lord products and services.

LORD MANUFACTURING COMPANY, ERIE, PA.
Canadian Representative: RAILWAY & POWER ENGINEERING CORP. LTD.

LORD Vibration Control Systems



You'll be surprised at these figures!

- 80 million Americans own $48 billion of U. S. Savings Bonds.
- 20,000 of the nation's 38,000 firms employing 100 or more persons are operating Payroll Savings Plans.
- 7,500,000 workers are buying an individual average of $20 of Bonds per month.
- For the year 1948, sales of Series E Bonds exceeded redemptions by $495,148,000. The net figure for all Series after redemptions and maturities was $2,151,140,000.

What does all this mean to you? Well, it means first of all that your Treasury Department is successful in its program of increasing the nation's economic security by spreading the national debt. Secondly it means that most of the nation's business leaders recognize the value of the Payroll Savings Plan sufficiently to promote it within their companies.

For example...

To give you some idea of the Plan's growing popularity: 86,384 employees of a prominent electrical manufacturing company were investing in Bonds at the rate of $30,005,270 as of the end of 1948. This is a gain of nearly 100% over 1947, when 45,000 employees participated in that company. The treasurer of a well-known shoe company reported that, of his concern's 19,060 employees, 9,240 were in the Plan and had invested $146,807.32 in Bonds via deductions during the preceding month.

Why promote it?

We all know how buying Bonds builds an individual's future security. But there are *company* benefits too! Nation-wide experience shows that Payroll Savings increases each participating employee's peace of mind—makes him a more contented, more productive worker. It reduces absenteeism, lowers accident rates, increases output, and improves employee-employer relations.

It's easy to boost participation

1. See that a top management man sponsors the Plan.

2. Secure the help of the employee organizations in promoting it.

3. Adequately use posters and leaflets and run stories and editorials in company publications to inform employees of the Plan's benefits to them.

4. Make a person-to-person canvass, once a year, to sign up participants.

These first four steps should win you 40-60% participation. Normal employee turnover necessitates one more step:

5. Urge each new employee, at the time he is hired, to sign up.

Nation-wide experience indicates that 50% of your employees can be persuaded to join—without high-pressure selling. All the help you need is available from your State Director, U. S. Treasury Department, Savings Bond Division.

The Treasury Department acknowledges with appreciation the publication of this message by

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and The Advertising Council.

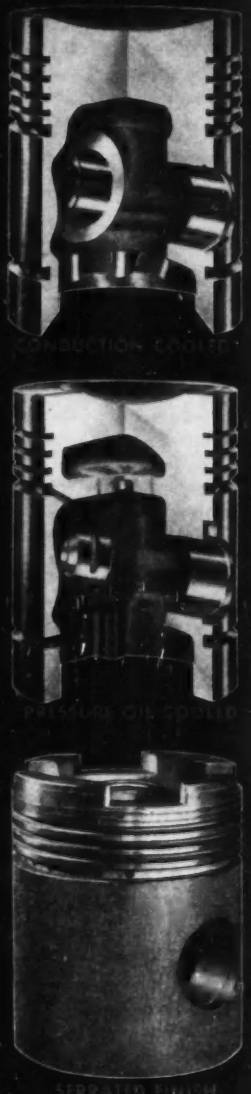
Index to

The Advertisers' Index is published of the advertising contract. Every rectly. No allowance will be made

Advertisers

as a convenience, and not as part care will be taken to index cor- for errors or failure to insert.

ANY ENGINE IS A BETTER ENGINE WITH PISTONS ENGINEERED BY ZOLLNER



COMPLETE
ENGINEERING COOPERATION

TAILOR-MADE PISTONS FOR YOUR DIESEL ENGINE

Original Equipment in America's Finest Motors

WAUKESHA	MARMON-HERRINGTON
HERCULES ENGINES	GMC
MACK	
FWD	CORBITT
TWIN COACH	DIAMOND-T
IHC	REO
HALL-SCOTT	CONTINENTAL
BUDA	SEAGRAVE
CUMMINS	FEDERAL

ZOLLNER

PISTON EQUIPMENT *for* INTERNAL COMBUSTION ENGINES —BOTH GASOLINE AND DIESEL

ZOLLNER MACHINE WORKS
FORT WAYNE, INDIANA

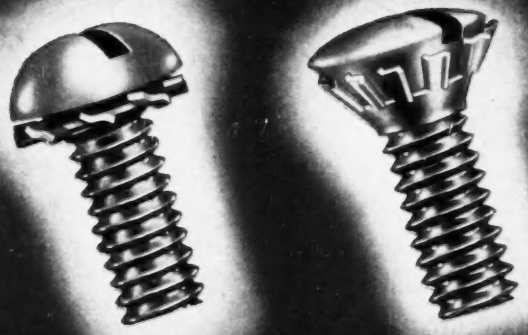
Everlock

SCREW-WASHER ASSEMBLIES

FEATURING THE FAMOUS

Everlock "CHISEL-EDGE"

LOCK WASHER



Look in on the multiple advantages of Everlock Screw-Washer Assemblies . . . quicker, lower cost assembly . . . automatic assurance that lock washers are applied where needed . . . simplified ordering and stocking . . . the unmatched protection of Everlock wide chisel edges.

There is an Everlock Screw-Washer Assembly for every need, with non-removable Everlock Lock Washers of the proper type to provide the extra staying power to resist every hazard of vibration, expansion, contraction and strain. Write for full particulars.

THERE'S AN

Everlock

LOCK WASHER

FOR EVERY NEED

STANDARD EXTERNAL
Everlock

STANDARD INTERNAL
Everlock

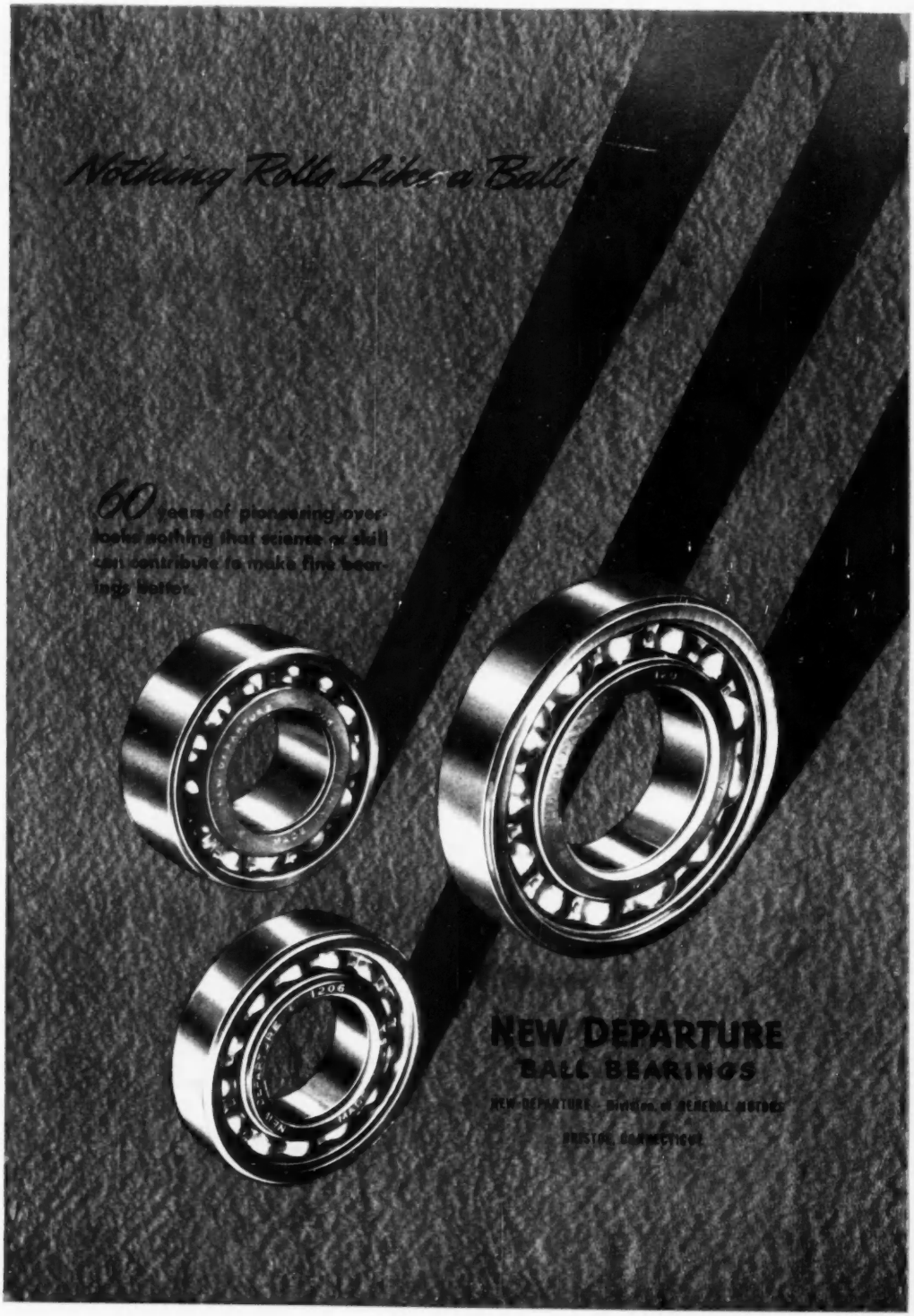
STANDARD 80°
COUNTERSUNK
Everlock

STANDARD
INTERNAL-EXTERNAL
Everlock

THE WASHER THAT HAS THE EDGE

PRODUCTS OF

• THOMPSON-BREMER & CO., 1642 W. HUBBARD ST., CHICAGO 22, ILL. •


Nothing Rolls Like a Ball
60 years of pioneering overlooks nothing that science or skill can contribute to make fine bearings better.
NEW DEPARTURE
BALL BEARINGS
NEW DEPARTURE — Division of GENERAL MOTORS
BRISTOL, CONNECTICUT